APRIL, 1954

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Finishes on *Metal* Products

APRIL, 1954

THE LEA METHOD OF FINISHING

The Lea Manufacturing Company pioneered and continues to specialize in the development of CLEAN-WORKING polishing and buffing compositions. These special methods minimize cleaning by employing selected grades of LEA COMPOUND, LEAROK, or other special compositions which virtually eliminate excessive cleaning or hand-scrubbing common with regular heavy grease compounds.

Here are some typical case studies of Lea Methods.

CASE STUDY #1

Material: Sterling silver.

Article: Table flatware.

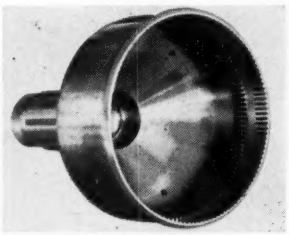
Method of Forming: Customary for this type of work.

Final Finish: Bright Butler.

Lea Method:

1. Cut-down buffing with Tripoli.
2. Cleaning.
3. Lea Compound Grade A-1 or 5023 on a 6" diameter loose muslin buff at 4400 r.p.m.

Remarks: The Lea Method produces a more pleasing finish in about half the time than that produced by any wet method. When a more pronounced Butler finish is desired, a packed buff with Grade A-63 Lea Compound is used.



CASE STUDY #2

Material: Steel.

Article: Bearings, motor parts and other aircraft engine parts, some with counter-sunk holes.

Method of Forming: Forging.

Final Finish: Smooth with burrs removed and slight radius provided.

Lea Method:

Lea Compound Grades "L," "B" or "C" at 5500 surface feet per minute on various types of buffs, string brushes, leather bobs, etc., depending upon the shape of the piece and the accessibility of the surface to be abraded.

Remarks: Work of this type had previously been done by hand with files, emery cloth or burring tools. Lea Compound removes all metal marks and burrs much faster and more economically than hand work. Tolerances are protected by the flexibility of the Lea Compound wheel.

CASE STUDY #3

Material: Brass and bronze.

Article: Bookends and novelties.

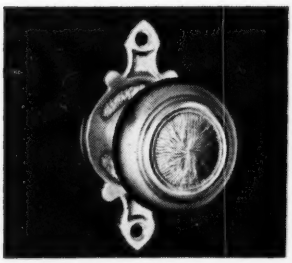
Method of Forming: Casting.

Final Finish: Brushed effect.

Lea Method:

1. Lea Compound Grade "C" on 8" loose wheel at 1500 to 2000 r.p.m.
2. Lacquering.

Remarks: Lea Compound is especially applicable to this type of work as there are numerous recesses in which buffing dirt would lodge with the older method using Tripoli buffing and wet scratch brushing. Accordingly, costly hand cleaning is thereby eliminated.



CASE STUDY #4

Material: Brass.

Article: Door knobs and escutcheon plates.

Method of Forming: Stamping.

Final Finish: Oxidized and relieved.

Lea Method:

1. Cut-down buffing with Tripoli of surface previously polished.
2. Clean.
3. Oxidized in liquid sulphur.
4. Lea Compound Grade "FG" on a 12" diameter loose muslin buff at 1200 r.p.m.
5. Lacquering.

Remarks: Grade "FG" Lea Compound gives a medium butler relieving which requires no cleaning or drying before lacquering.

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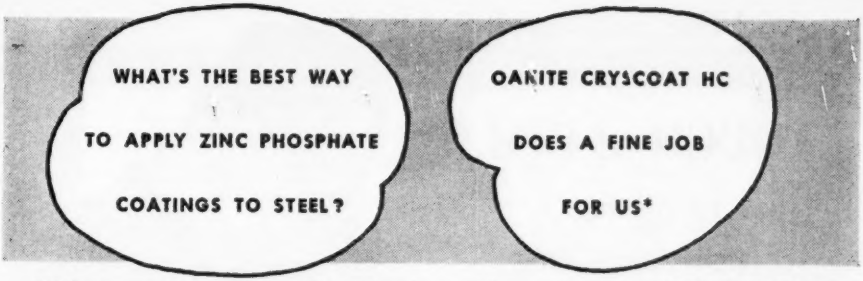

*This comment came from a Pennsylvania munitions maker, who added that Oakite CrysCoat HC has put an excellent zinc phosphate coating on 385,000 shells with "absolutely no trouble . . . maintenance and control are very easy."

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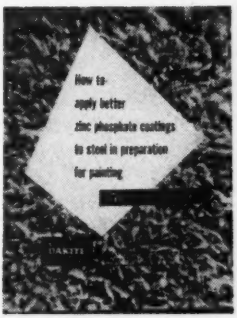
2 The heavy coating gives excellent protection against electrochemical corrosion. *See page 7.*

3 The CrysCoat HC Process is easy to control. Only one material is used for make-up and up-keep. No accelerators, starters, toners or other additives are needed. Only one simple type of titration is used. *See page 9.*

4 The CrysCoat HC reaction produces relatively little sludge and scale. *See page 10.*

5 Stainless steel is not necessary for all parts of the equipment. *See page 11.*



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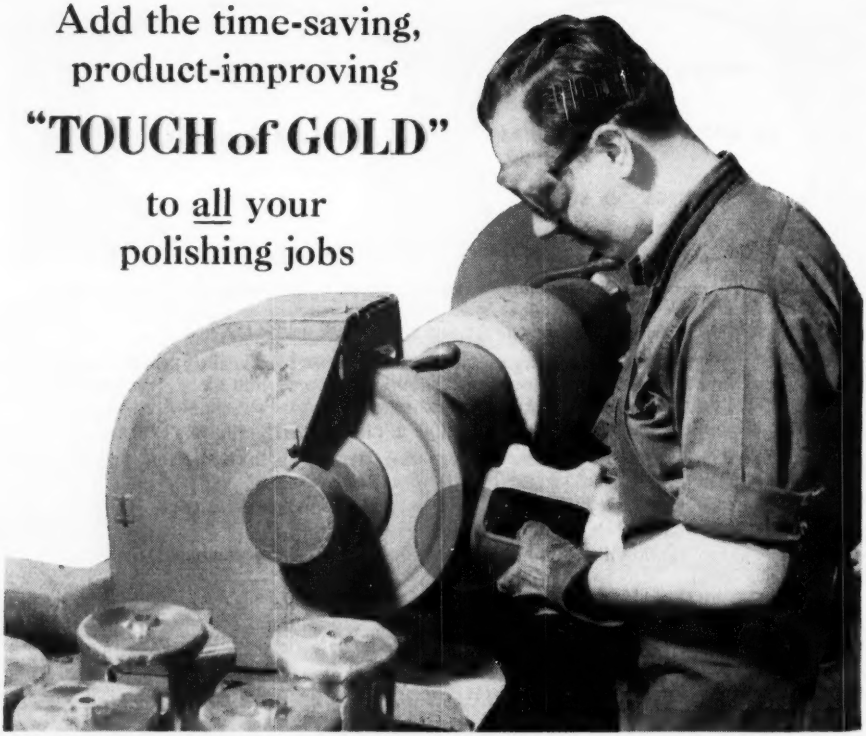

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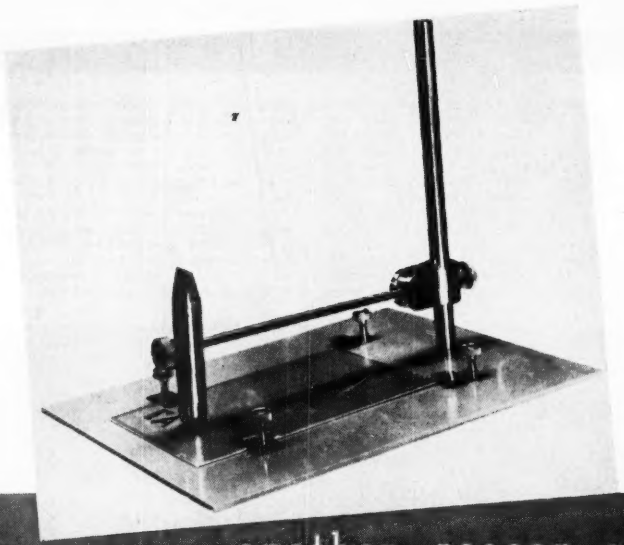

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PRODUCTS finishing

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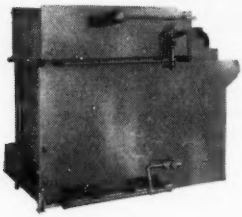

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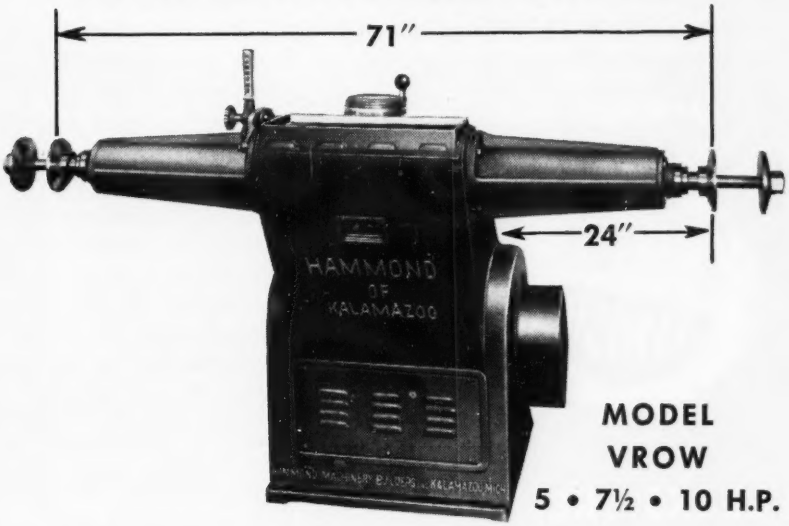

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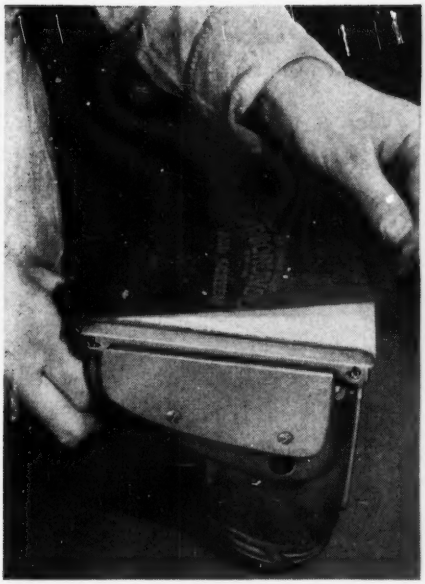

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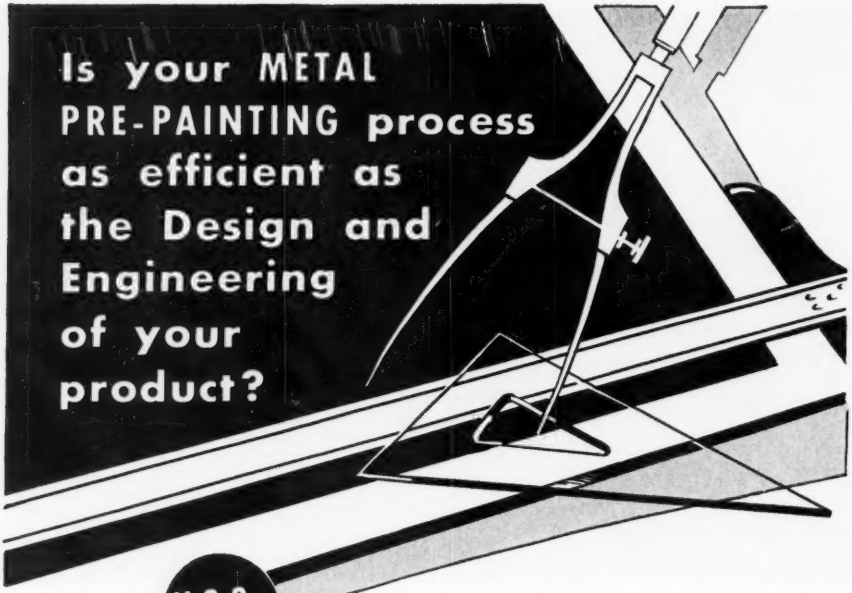

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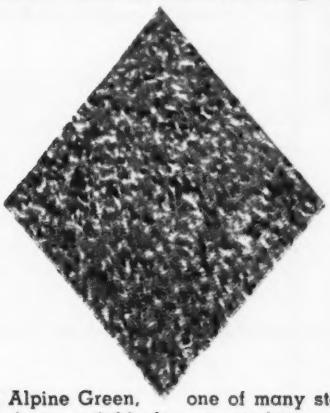

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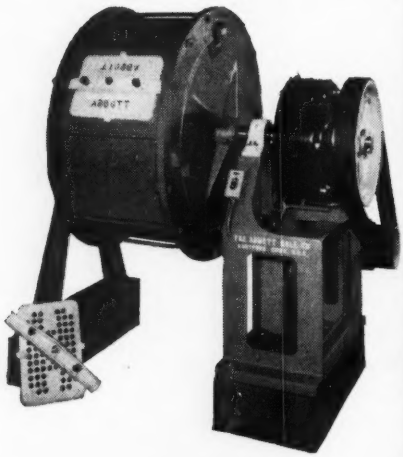

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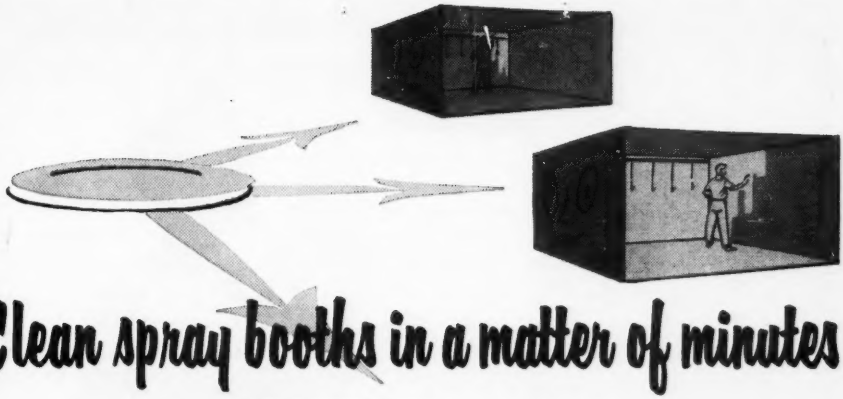

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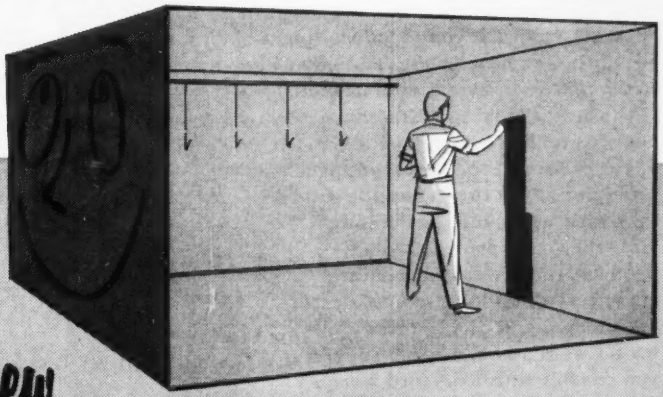

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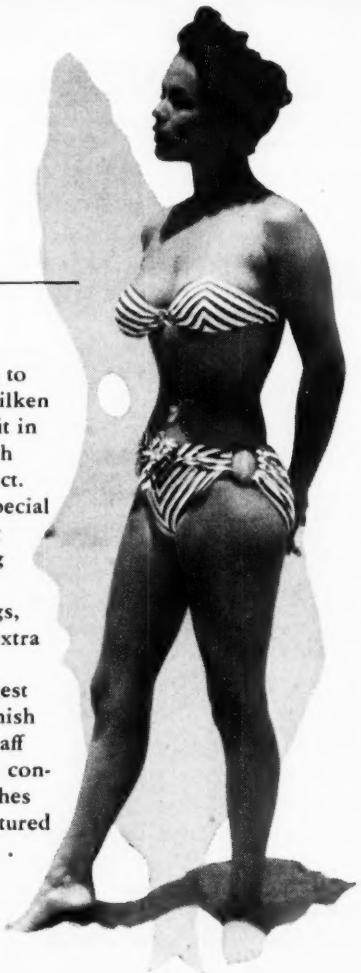

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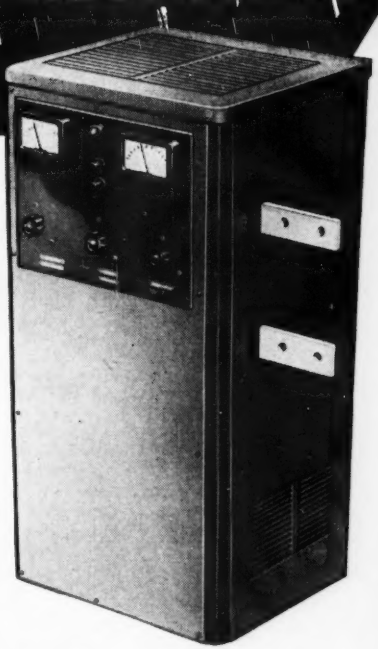

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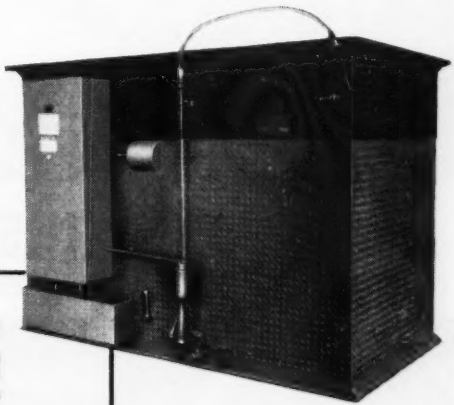

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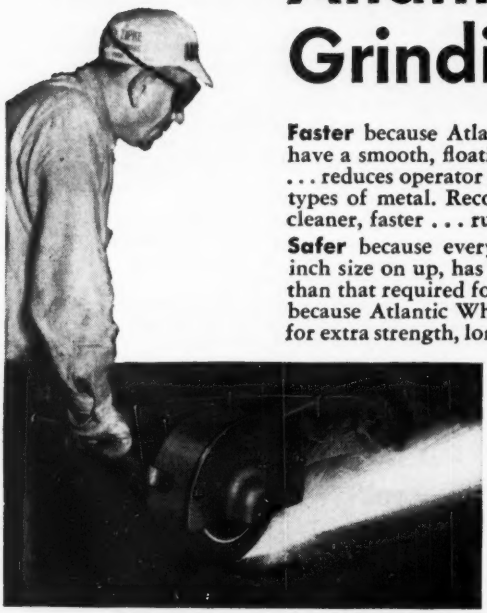

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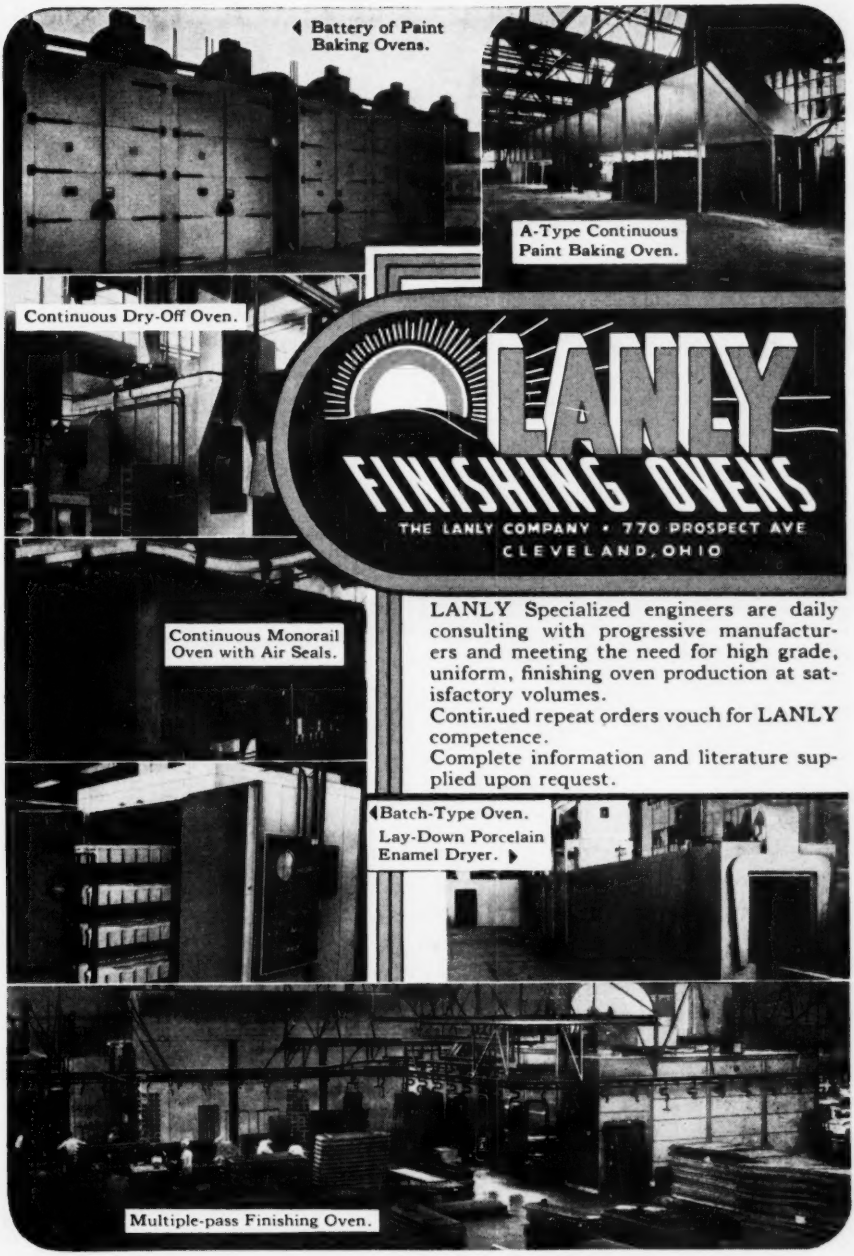
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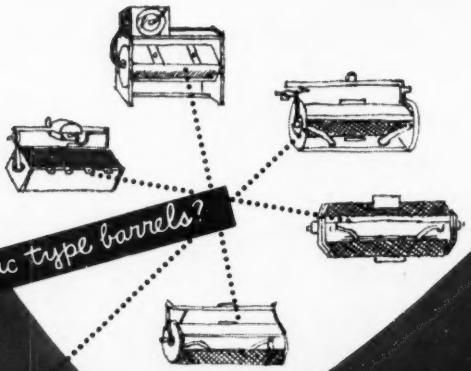

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PF editorial

APRIL, 1954

Vol. 18, No. 7

Let's Talk About Finishes!

American industry has accepted fully the fact that an active, intelligent public relations program is vital to progress, if not, in fact, to continued existence. Such a program carries the company's or the industry's message to the general public —the consumer—the customer. The more a potential customer knows about your industry or your product, and the more he appreciates the trouble you have taken to make that product the best in the field, the easier it becomes to sell him that product.

The vital part played by product finishes in today's competitive selling can not be emphasized too often. Salesmen and sales managers all know how important is the finish on the product they have to sell; yet the public, generally, is not aware of the various kinds of finishes, their particular advantages, and the conditions under which each will give the ultimate in satisfactory service. Those product manufacturers who wish to gain a competitive advantage by stressing the enhanced value of their product due to its high quality finish, of whatever type, will find this easier to do when the buying public—the customer—know more about the properties and characteristics of various kinds of finishes.

New developments in finishes and finish application methods are discussed in technical, professional, and business magazines. They form the subjects for discussion at technical and trade association conventions and local meetings. While much of the advertising about finishes, application methods, and equipment is, understandably, of a competitive nature, some programs stressing the value of a quality finish, and the virtues of a plated, paint, or porcelain enamel finish have been run in business and technical magazines. Technical societies have conducted educational television programs on finishes and finishing processes. Some work of technical and trade associations in the educational field has been summarized previously.* All of these messages about finishes reach segments of the buying public, and are most constructive and essential.

There is still much to be done. Whether you are engaged in applying finishes to today's manufactured products, whether you are a finish supplier, manufacturer, or finishing equipment salesman, the more you know about finishes and finishing processes, and the more you discuss finishing, the more the public will know about the industry, and the more interest and attention will be given to quality finishes.

And it isn't something that you can tell once and then forget; the project of "talking finishes" must be continuous and enthusiastic to be effective.

Ezra A. Blount

—EDITOR

* *"Education in the Finishing Industry;—A Continuing Requirement," PRODUCTS FINISHING, September, 1953.*

Production Barrel

By EZRA A. BLOUNT
Editor

Copper, nickel, zinc and cadmium can be plated in the barrel plating installation recenty completed at Varland Metal Service, Inc., Cincinnati. The versatile, well-engineered setup consists of a double line of tanks served by an oval, overhead monorail conveyor. Solution temperatures are kept constant by automatic temperature controls. A barrel loading chart keeps load surface areas equal, and makes possible close control of deposit thickness.

JOB plating plants must be equipped to plate not only a variety of types, sizes, and kinds of metal parts, but must also be able to deposit a variety of metal coatings, according to customers' specifications. Then too, the successful job shop must be able to do a high quality job efficiently, so that its price to the customer will be competitive.

As its volume of barrel plated production increased, Varland Metal Service, Inc., decided to expand its barrel plating facilities, and in so doing, to accomplish the necessary objectives of increasing the efficiency of the operation, and maintaining the quality of the plated product at a high level. The barrel plating installation described here is the result, and marks the most recent expansion of this progressive company.

Varland Metal Service was founded in 1946, and, although it has not been in business for many years, has enjoyed a vigorous growth to its present size. Although a job plating shop is not generally limited to any particular class of work, Varland has specialized to some degree in the copper, nickel, and chromium plating of zinc base die castings, and on production barrel plating of small

Plating to Specifications

parts. Equipment for deburring and barrel finishing castings and stampings is also in use in this modern job plating plant.

Planning Factors

Basic considerations in planning the installation included the types of metal which had to be deposited, and the size of the equipment, both from production volume and practical considerations.* First, it was determined that provision must be made for copper, nickel, cadmium, and zinc plating, as well as a num-

* Plan Your Finishing Facilities and Operations," by Thomas J. Menzel, PRODUCTS FINISHING, July, 1953.

Fig. 1—A view of the barrel plating unit recently installed in the plant of Varland Metal Service, Inc., Cincinnati. As can be noted in the illustration, an overhead loop monorail has been installed above the double line of processing tanks to facilitate movement of the barrels from one tank to another through the process. Located above the monorail is a 3-phase, 220 volt, electrical bus bar which not only supplies power to operate the electric hoists, but also serves as a source of electric current to operate the barrel rotating motor during the time the barrels are being transported from one tank to another. An elevated wood slat walkway makes easier the movement of barrels through the plating unit. In the left foreground can be seen the copper plating tank and in the right foreground, the 4-barrel zinc plating unit.

Fig. 2—A plan view of the Varland barrel plating unit. In this illustration the various processing tanks are identified and their location indicated. As can be noted, the overhead monorail track, together with switches and return loops is indicated, as well as rectifiers and dryers. The tanks, all the same depth, are mounted on wooden frames and insulated by plastic support members.

(Illustration courtesy Varland Metal Service, Inc., Cincinnati, Ohio.)

ber of surface conversion coatings for zinc and cadmium. Accordingly, cleaning, plating, and dip coating cycles were planned to provide the necessary process steps.

Since the barrel is the basic production unit in an installation of this kind, Varland engineers next standardized on the 14 by 30 inch transparent plastic plating barrel, selecting the barrel manufactured by the Hardwood Line Mfg. Co., Chicago 47, Illinois. Establishing the standard barrel size determined tank widths and depths for the various cleaning, rinsing, dipping, and plating tanks.

Based on a consideration of cycle times, the relationship of various cleaning cycle times to plating times, and total plating production volume desired, the lengths of various tanks were determined.

Plant Layout and Equipment

Efficient handling of small parts in quantity dictates that trucking shall be held to a minimum. To accomplish this purpose, and achieve processing economies, the barrel plating installation was planned so that the process flow would take a general U-shape, the barrels being loaded and unloaded in the same general area. Accordingly, the processing tanks were set in two lines, separated by a 4-foot working aisle. An overall view of the unit is shown in Fig. 1.

Realizing the importance of mechanical handling equipment, since ease and convenience of movement of the barrels are basic necessities, Varland engineers installed an overhead loop monorail, oval in shape, above the centerlines of the two lines

of processing tanks. Barrels are moved through the process smoothly and efficiently with the aid of two ½-ton electrically operated hoists which lift or lower barrels at the rate of 35 feet per minute. Figure 2 is a plan view of the barrel plating area showing the relative location of the tanks, monorail, and some of the auxiliary equipment.

Tank sizes were established according to the number of plating barrels that each tank must accommodate at any one time. The smaller tanks (1-barrel units) are 32 by 45 by 32 inches deep. Two-barrel units are 64 by 45 by 32 inches deep. The zinc plating tank is a 4-barrel unit—128 inches by 45 by 32 inches deep.

The cleaner, water rinse, and cyanide dip tanks are plain steel, most of them fitted with dam-type overflows. The acid dips, acid rinse, and chromate dip tanks are formed from plastic material reinforced with Fiberglas (Pla-Tank — resin-bonded Fiberglas) and are products of The Chemical Corporation, Springfield, Massachusetts. Copper, cadmium, and zinc plating tanks are plain steel, and the nickel plating tank is steel, Koroseal lined.

Tank heating is accomplished by steam coils; in some tanks plain pipe coils are used, and in others Platecoils are installed. Heating coils are fitted with Sarco float thermostatic steam traps to increase the heating efficiency. Condensation is piped to hot water rinse tanks, and thus flows to the drain—preventing any possible contamination of the boiler water.

Both the cadmium and zinc plating tanks must be cooled, since both increase in temperature during operation. This is accomplished by circulating cooling water from a heat exchanger, operated in connection with a refrigeration unit, through Platecoils in the tanks. (During the winter months, city water may be used without auxiliary refrigeration, since water temperature is about 50 deg. F.). This water is discharged into cold water rinse tanks, and hence does not recirculate. This provides a source of slightly warmed water for the rinse tanks, and at the same time lowers refrigeration cost since raw water is colder than water which has passed through plating tank coils.

Tank temperatures of cleaning and plating tanks are controlled automatically with temperature controllers manufactured by the Partlow Corporation, New Hartford,

Fig. 3—Guided by the loading chart, the barrel plater weighs out a standard load of the parts to be plated. A combining weighing and loading chute, or scale pan, speeds up this operation.

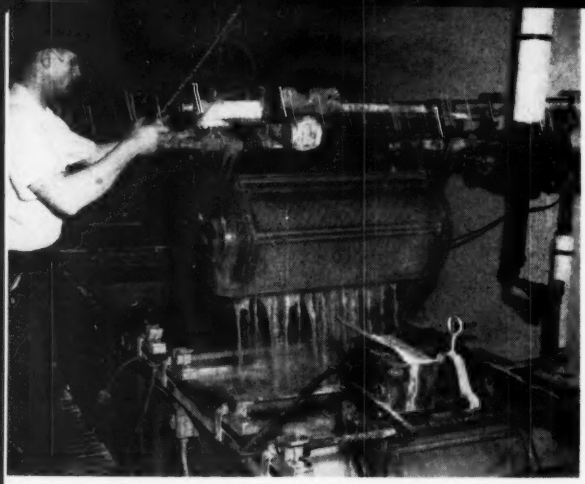

Fig. 4—A load of parts to be plated, having received the 10 minute anodic cleaning treatment, is removed from the cleaner tank to be rinsed and processed through the plating cycle. The barrel rotates at 5 r. p.m. both while it is in the solution and while it is being transported from one tank to another. The rotating motor is mounted in the barrel superstructure. As can be noted in this illustration, the electrical connection between the 3-phase, 220 volt bus bar located above the monorail has been plugged into the barrel motor receptacle. In the left foreground can be noted the 3-phase, 220 volt, electrical connection which is plugged into the barrel motor receptacle to rotate the barrel while it is in a cleaning or plating tank.

New York. The controllers have a two-step control, which acts as a safety feature to guard against temperature rise due to failure of steam valves. When the desired tank temperature is reached, the controllers close steam valves. If the tank temperature rises 10 deg. F. over the desired temperature, a signal bell rings and a red light is lighted. The controllers must then be reset manually, thus insuring that operators will give immediate attention to the tank in question.

Power for anodic cleaning is supplied from two rectifiers (Lektron and Richardson-Allen) connected in series to provide 500 amperes direct current at 12 volts. Current for copper, nickel, and cadmium plating is furnished by a 1500 ampere, 12 volt Richardson-Allen rectifier. A 2000 ampere, 12 volt rectifier provides power for zinc plating.

To standardize the current requirements for the barrels it was necessary to establish a basic load or plating surface for each barrel load. This was accomplished by preparing charts classifying various groups of parts by part number, kind, and size. For each kind and size of product, a standard weight of barrel load has been established. Stampings are classified according to thickness; nuts by dimension across the flat side; bolts, springs, threaded rods, and unthreaded rods according to diameter.

Another factor that must be considered is the maximum volume of work that can be loaded into a barrel. On certain types of parts the volume consideration outweighs the area consideration. Parts do not tumble satisfactorily and do not plate evenly throughout the load if the barrel is loaded much more than half full. Another factor is the maximum weight. The transparent plastic barrels are normally rated at about 150 pounds maximum weight. To insure that no damage is done to the equipment, loads are limited to

or held below 140 pounds.

There is still another factor, which may be termed the tumbleability of parts. Certain parts, such as certain wire forms and springs which tend to nest, clog, or form a solid mass, have to be plated at a smaller load than would otherwise be indicated.

In loading (Fig. 3) the plater need only refer to the standard charts and note the weight required for a standard barrel "load." By holding surface area in each barrel to approximately the same value, there is no problem of unequal current distribution in a multiple barrel plating setup. Further, current values can be set and loads timed accurately to deposit the thickness of metal required by customers' specifications.

Copper Plating Process

1. Barrels are loaded and moved by a hoist into the soak cleaner tank. In this tank parts are cleaned for 10 minutes in a solution of Pennsalt K-45 (8 oz./gal.) held at 160 deg. F. to remove the bulk of surface contamination. Barrels rotate at 5 r.p.m. while in the tank, actuated by a driving motor built into the barrel superstructure. This motor is plugged into a 3-phase, 220 volt outlet while the barrel is in a tank, and can be connected to an outlet on the hoist also, so that barrels rotate during transfer from tank to tank. This minimizes solution dragout or carryover.

2. Following soak cleaning, barrels are transferred to an anodic cleaner tank, and cleaned anodically for 10 minutes in Pennsalt K-8 (8 oz./gal.) held at 160 deg. F. to provide a water-break-free surface required for bright, adherent plate. Figure 4 shows a barrel being removed from the anodic cleaner at the end of the cycle.

(Note: Die castings are cleaned in a solution of 5 oz./gal. Pennsalt Z-54 or 3 to 5 min. at 160 deg. F.)

3. Hot water rinse.

4. Cold water rinse.

5. Acid dip in 20 per cent (by volume) muriatic acid at room temperature. (Springs, sulfurized steel parts and die castings receive this treatment only.)

Fig. 5 — A view of the 4-barrel zinc plating tank. In the right background is the 2000 ampere, 12 volt rectifier which provides power for this operation. In the left background is located the 2-barrel cadmium plating tank. The electrical connections mounted on the tank are connected to the barrel rotating motors.

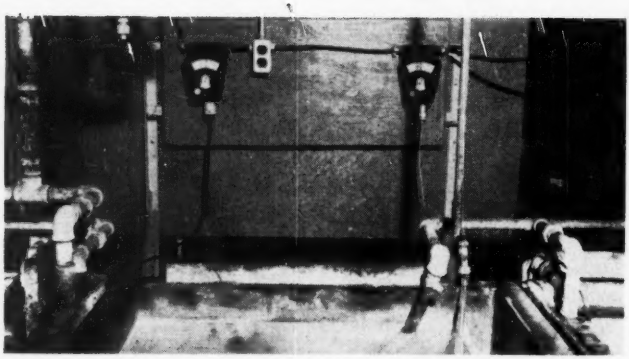

Fig. 6 — These two Partlow temperature controllers regulate zinc and cadmium plating tank temperatures. The controller on the right maintains the proper temperature in the zinc tank, and the controller on the left accomplishes the same purpose in the cadmium tank. As tank temperature rises above the proper point, the controller opens the valve in the cooling water line until the temperature is brought back to the proper value, at which time the valve closes.

6. Acid dip in 50 per cent (by volume) muriatic acid at room temperature. The bulk of the parts to be plated receive this treatment following a dip in the 20 per cent acid. For economy of operation, the 50 per cent acid is used to make required additions to the 20 per cent acid. Fresh acid is added to the 50 per cent solution only.

7. Cold water rinse.

8. Dip in a solution of 6 oz./gal. sodium cyanide and 1 oz./gal. caustic soda. This process is used for

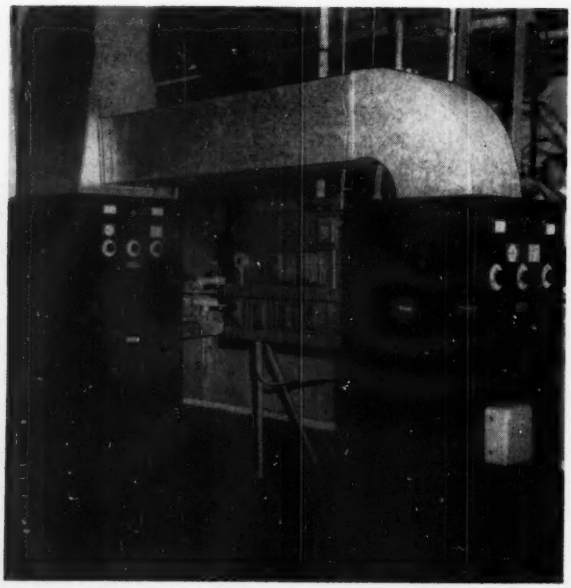

Fig. 7 — These Richardson-Allen rectifiers provide power for the barrel plating tanks. The rectifier on the left is a 2000 ampere, 12 volt rectifier which furnishes power for the zinc plating tank. The rectifier on the right, a 1500 ampere, 12 volt rectifier, provides power for copper, nickel and cadmium plating. Fresh air is drawn into the plant and directed into the rectifiers through the ducts shown in the illustration. This feature accomplishes the double purpose of cooling the rectifier stacks and preventing any possibility of corrosion due to steam or acid fumes from the plating room.

parts to be copper plated and also as an additional cleaner for brass.

9. Cyanide copper plate in 2-barrel capacity steel tank. The standard cyanide copper plating solution is held at 125 deg. F. A copper plate 0.0001 inch thick can be deposited in 10 minutes. The steel rods, on which the copper anodes are hung, are submerged below the solution surface to provide good contact between rod and anode hooks and to eliminate rod cleaning. Steel anode rod supports connect the rods with the copper bus bars. Cathode contacts similar to those shown in Fig. 4 are employed.

Nickel Plating

Copper plated parts or brass parts, cleaned and cyanide dipped (step 8, above), are given a thorough cold water rinse and 5 per cent (by volume) sulfuric acid dip prior to nickel plating.

Nickel plating is carried out in a single barrel capacity steel, Koroseal lined tank. The solution contains:

Nickel sulfate	32 oz./gal.
Magnesium sulfate	40 oz./gal.
Magnesium chloride	10 oz./gal.
Boric acid	4 oz./gal.
Tru-Brite Nickel Brightener	50 cc./load

The solution is heated with a lead steam coil and a temperature of 110 deg. F. is maintained with a Partlow controller. Plating is carried out for the time required to obtain the desired thickness of plate.

Nickel plated parts are given a cold water rinse followed by a hot water rinse, unloaded into wire mesh or perforated steel baskets and dried in Nobles centrifugal dryers.

Zinc Plating

Parts to be zinc plated are processed through a preparation cycle similar to that described for copper and nickel plating. The cycle for zinc plating is as follows:

1. Soak clean 10 minutes.
2. Anodic clean 10 minutes at

Fig. 8 — This illustration shows a barrel load of plated parts being processed through the final warm water rinse preparatory to unloading. Plated work can be seen clearly through the plastic plating barrel panels.

500 amperes. (Die castings are cleaned in 5 oz./gal. Pennsalt Z-54 for 3 to 5 minutes at 160 deg. F.)

3. Cold water rinse.
4. Acid dip in 20 per cent muriatic acid.
5. Acid dip in 50 per cent muriatic acid, if the parts being processed require this treatment.
6. Cold water rinse.
7. Dip in a solution of 6 oz./gal. sodium cyanide.
8. Zinc plate in the 4-barrel steel plating tank shown in Fig. 5 for 40 minutes.

The plating solution contains:

Zinc cyanide	8 oz./gal.
Caustic soda	10 oz./gal.
Sodium cyanide	5.3 oz./gal.

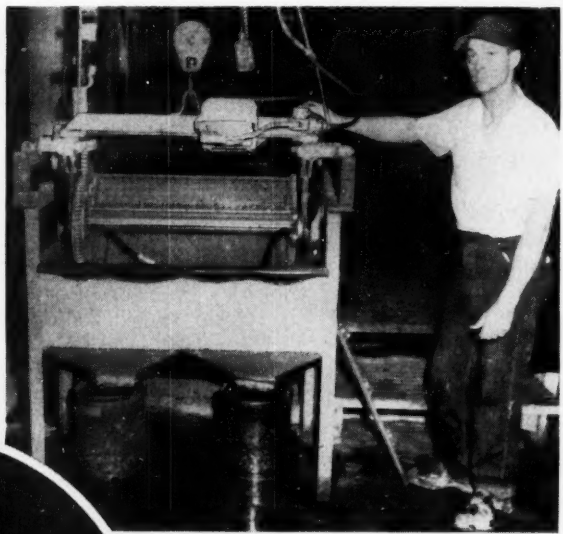

Fig. 9—After plated parts are rinsed, the barrel is lowered into the steel, rubber lined unloading frame shown in this illustration. Barrel covers are removed and the barrel is rotated to empty the plated parts into the wire mesh baskets located below the unloading frame.

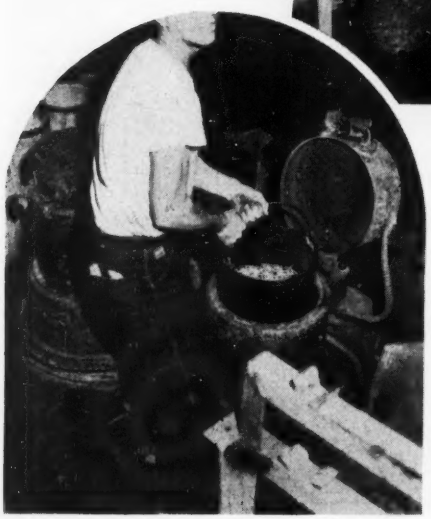

Fig. 10—A basket of plated parts is shown being lowered into one of the Nobles centrifugal dryers. After the cover of the dryer is closed, the basket of parts is swirled rapidly so that the products shed most of the residual water. Aiding in the process is a blast of air, heated by electrical heating coils located in the cover of the dryer, and drawn through the basket of parts by a fan located in the base of the dryer.

(Photos by PRODUCTS FINISHING)

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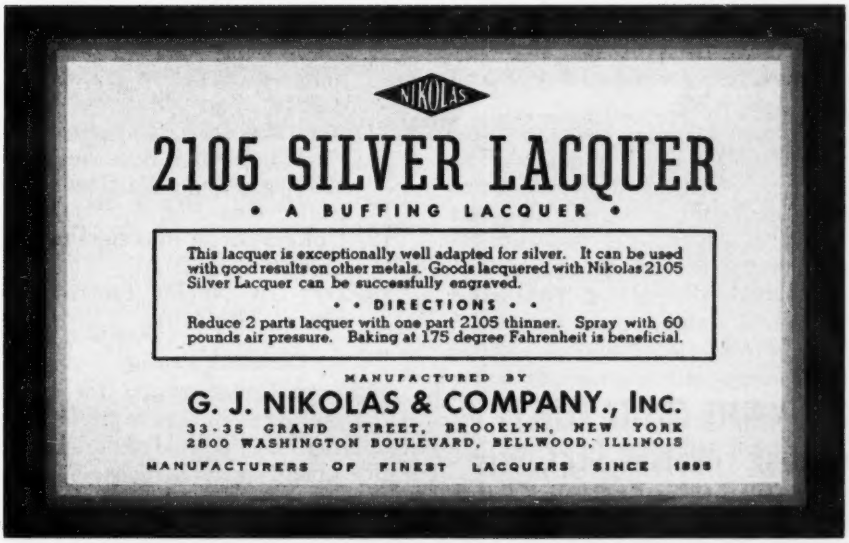
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• A BUFFING LACQUER •
This lacquer is exceptionally well adapted for silver. It can be used with good results on other metals. Goods lacquered with Nikolas 2105 Silver Lacquer can be successfully engraved.
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Reduce 2 parts lacquer with one part 2105 thinner. Spray with 60 pounds air pressure. Baking at 175 degree Fahrenheit is beneficial.
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- **Water White**
- **Crystal Clear**
- **Non-Discoloring**
- **Excellent Adhesion**
- **Mar-Resistant Hardness**

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A solution temperature of 85-90 deg. F. is maintained by four steel Platecoils through which cool water is circulated. The Partlow temperature controller shown at right in Fig. 6 keeps the temperature at the desired point by opening or closing the cooling water valve as required.

Power for the zinc plating tank is furnished by a 12 volt, 2000 ampere Richardson-Allen rectifier, shown in the right background of Fig. 5 and at the left in Fig. 7.

The steel bars on which the anode baskets are hung in the zinc plating tank are welded to the tank sides below the solution level. The bus bars from the rectifier are connected directly to the anode support bars outside the plating tank. Thus the entire tank acts as an anode. This arrangement controls anode corrosion and prevents excessive metal buildup in the solution. As can be noted in Fig. 5, the cathode connections are insulated from the plating tanks.

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DETROIT HANDY "TAC" RAG
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DETROIT "TAC" RAGS are an absolute necessity for cleaning any metal, wood or plastic surface before painting. Removes all dust, lint and sanding particles. Order today through your supplier.
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9. Cold water rinse.
10. Zinc plated parts are given either a chromate bright dip (bleached to a bright color in a 2 oz./gal. solution of caustic soda) or, if specifications so indicate, a yellow chromate coating, and dried in that condition.
11. Final hot water rinse held at 125 deg. F. by a Partlow controller (See Fig. 8).
12. Unload barrel into steel mesh baskets (Fig. 9).
13. Dry in Nobles centrifugal dryers. (Fig. 10).

Cadmium Plating

The metal preparation for cadmium plating is similar to that used for parts to be zinc plated. The cadmium tank is a 2-barrel steel unit equipped with cooling coils and a temperature control similar to that installed on the zinc tank. In both zinc and cadmium tanks are steam coils, with manual controls, to raise solution temperatures to the operating level when conditions require. The cadmium solution is operated between 85-90 deg. F. and its composition is held to the following analysis:

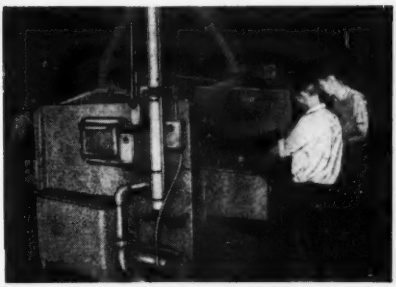
Cadmium metal	2.5 oz./gal.
Total sodium cyanide	18.0 oz./gal.
Caustic soda	3.0 oz./gal.

Unlike the practice of grounding the anode bar to the zinc tank, in the case of the cadmium tank it was found necessary to connect the an-

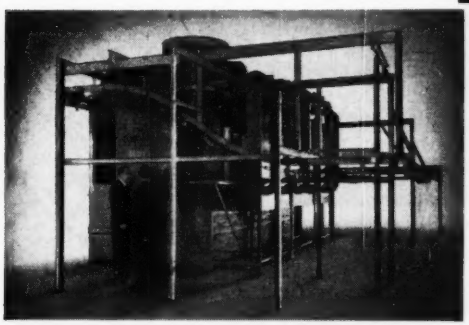
NO JOB Too Small or Too Large

Alvey-Ferguson has, for many years, provided Washing Machines to fit the varying needs of all types of metal working and other plants. These years of experience back the engineering of each specialized washer built to meet *your* plant's special requirements.

None Too Small — For washing metal products of various shapes and small metal parts this "Standard" Model A-F Washing Machine has been designed. It washes thoroughly, economically and efficiently.



The A-F Washer shown at right is being used by a large manufacturer to wash gummy lubricants from stampings, which must be thoroughly cleaned before assembly. Write for folder — today!



None Too Large — Twenty-seven tons of water are required to fill this huge A-F Cleaning and Drying Machine to operating level. Incorporated in this 14-foot giant are many special design features. A-F Engineers are specialists in all types of "custom-built" equipment. *Write for folder — today!*

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WASHING MACHINES FOR INDUSTRY

ode rod directly to the bus bar in the usual fashion. Otherwise, the rate of solution of the cadmium anodes would be insufficient to maintain the required metal content of the solution.

Power for cadmium plating is provided by the 1500 ampere, 12 volt, Richardson-Allen rectifier shown at right in Fig. 5. This rectifier also provides power for copper and nickel plating.

Chromate surface conversion coatings, bright or in color, are employed for cadmium plated parts when specified. Rinsing and drying operations are the same as for the zinc plating cycle.

FILM LIST. The Princeton Film Center, Inc., has compiled a new list of free loan 16 mm. sound films. Many in full color—these motion pictures are informative and entertaining and well suited for clubs, colleges, industrial and adult audiences. A wide range of subject matter offers timely and thoroughly interesting program material.

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BRADY SPECIAL MARKER BULLETIN No. 132. A colorful bulletin containing practical solutions to many special industrial marking problems has been published by **W. H. Brady Co.,** Dept. 302, 776 W. Glendale Ave., Milwaukee 12, Wisconsin, manufacturer of self-sticking industrial products.

Actual-size illustrations of pressure-sensitive markers and labels, tailor-made by Brady for special applications, are shown in three colors. Included are trade marks, instruction, inspection, part numbers, Underwriters' and serially numbered labels.

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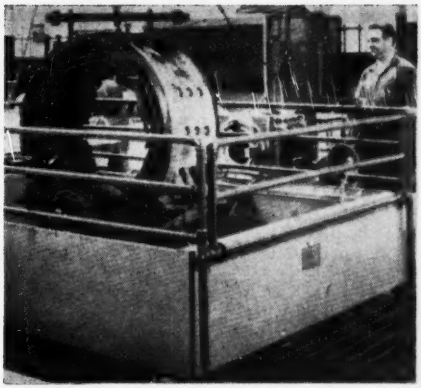
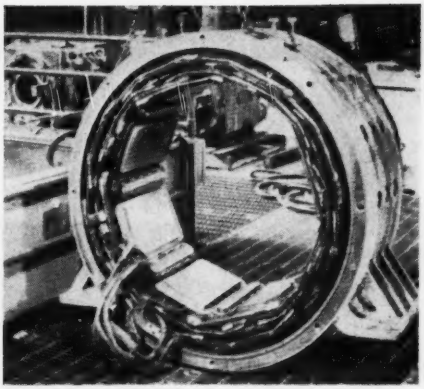


A GENERATOR STATOR is lowered into degreaser. Grime on intricate armature wiring is quickly dissolved by "Triclene" D vapors.



AFTER 5 TO 10 MINUTES the generator stator is removed from the degreaser thoroughly clean and completely dry.

Vapor Degreasing with TRICLENE® D

(*Trichlorethylene*)

cuts cleaning time from hours to minutes

Many industries are saving valuable man-hours in metal cleaning by vapor degreasing with Du Pont "Triclene" D. In the railroad industry, for example, "Triclene" D completely dissolves dirt and grease from traction motor and generator parts in 5 to 10 minutes. The same job used to take 4 *hours* with two men working together!

Another tough job was cleaning the wheels on diesel locomotives—requiring 8 man-hours by conventional methods. Vapor degreasing with "Triclene" D does it *more* thoroughly in just 10 minutes! And so the list of examples could be continued in many industries, where the vapor degreasing process teamed up with "Triclene" D saves time and labor.

"Triclene" D is specifically designed for vapor degreasing and is the result of over 20 years of research by Du Pont—pioneer manufacturer of chlorinated hydrocarbon solvents. You'll find proof of this experience and know-how when you see "Triclene" D at work. It's a pure and stable solvent—at its best on industry's toughest cleaning jobs. And experience does the talking when you call in a Du Pont technician . . . his grasp of metal cleaning problems is unique in the field.

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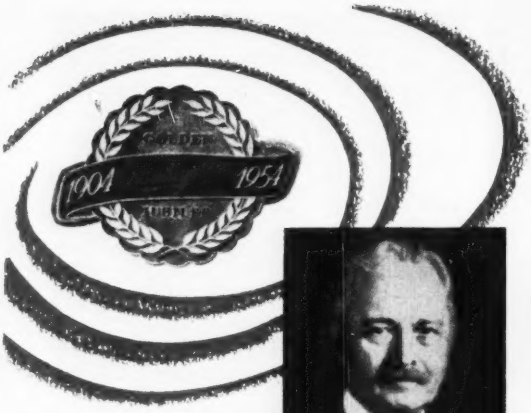

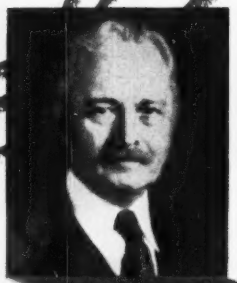

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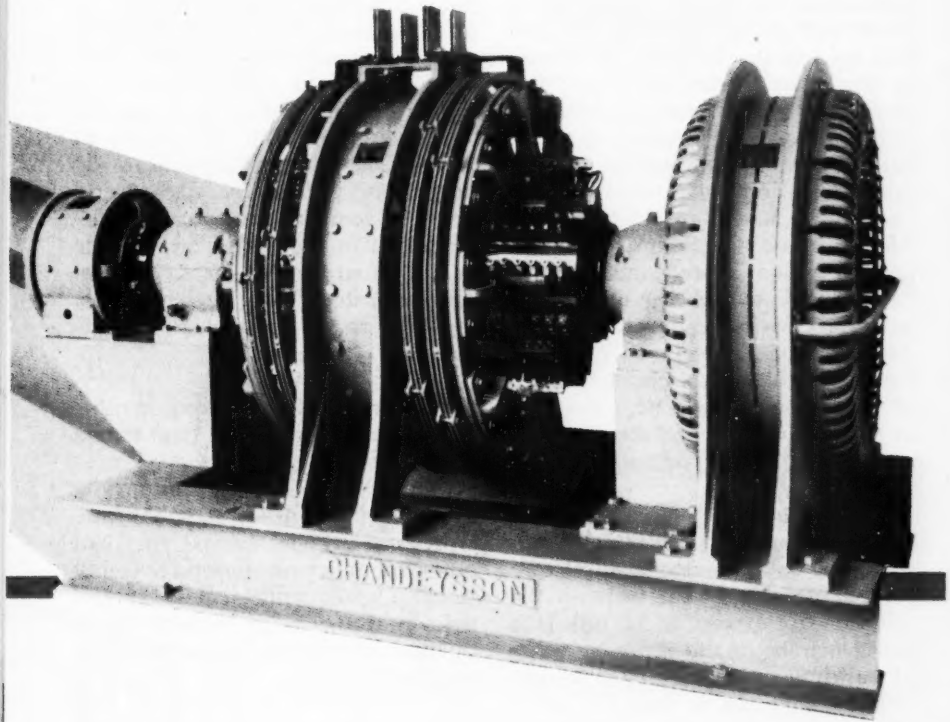

Tests On Pretreatment Primers

THE media referred to here as "pretreatment primers" are first-coating materials intended for metal work. The resin base and film-forming material is polyvinyl butyral. The pigment is a particular form of yellow zinc chromate, zinc tetrahydroxy chromate. The solvent carrier is a blended mixture of solvents, mainly alcohols, containing a specific quantity of water and phosphoric acid. The actual role of the various ingredients in this priming mixture is perhaps obscure, but the primary function of the major constituents can be regarded in a simple fashion. In the applied coating, the first duty of the phosphoric acid is to promote gelation of the resin as a film, and a secondary action, in conjunction with the water, is to etch the base metal and improve adhesion to it. The zinc chromate exerts the marked corrosion inhibitive characteristics of this class of pigment, especially in relation to iron and steel, and to aluminum, magnesium and zinc, and their alloys.

The zinc chromate pigmented, polyvinyl butyral pretreatment primer must be applied as a single thin coat, preferably of the order of 0.5 mil, and not exceeding 1.0 mil. It is not a primer in the ordinary sense of building up a primary thickness of paint that can be flatted if desired, and for this reason has been variously designated pretreatment, etch or wash primer. The material can be applied by conventional methods. Spray is usual, brush application is quite practicable, and flow or roller coating procedure is quite satisfactory.

The applied film dries rapidly to an adherent coating. It is surface dry in 10 to 20 minutes, but a couple of hours should be permitted before applying the filler and finishing coats. Generally, an overnight period of air drying is preferred.

The pretreatment primer may also be baked for 10 to 15 minutes at 250 deg. F. Temperatures up to 350 deg. F. are permissible, and several hours at temperature causes no degradation in properties, so that the baking of successive coats can safely be withstood. Any of the types of finishes can be used over the pretreatment primer without fear of incompatibility. Cellulose or polyvinyl, air drying or baking synthetic, or the ordinary oil base media may be used.

When applied to a wide variety of cleaned metal surfaces, the pretreatment primers exhibit excellent adhesion under severe service conditions. Consequently, these special primers provide for a very useful purpose as almost "universal" first coating materials. They are eminently suited to steel, aluminum, zinc and cadmium metals with which

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Combines safety, comfort and economy with Neoprene, which withstands oils, acids and corrosive chemical solutions. Resists heat, sunlight and abrasion. Resists cutting. Curved finger construction and flannel lining. Also available in other styles and constructions. Color—Black. One size only.

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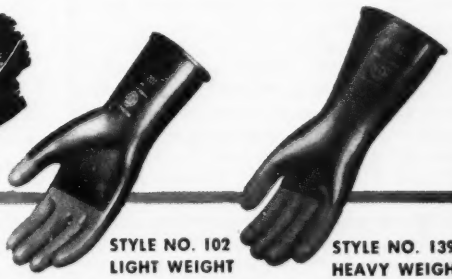

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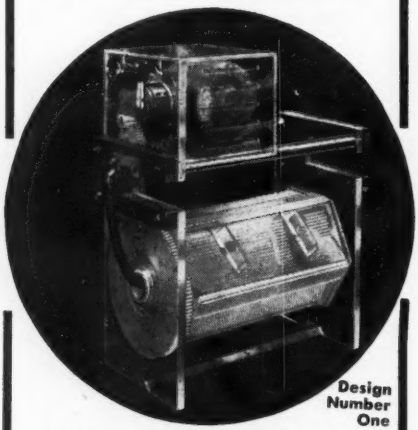

Design Number One

Portable Lucite Plating Barrel

THE STUTZ PORTABLE PLATING BARREL is designed and constructed of High Temperature Lucite to provide continuous processing of piece parts through the operations of Alkali Cleaning, Water Rinsing, Acid Treatment and Plating. Progression through these operations is made by manual handling or if necessary with the assist of an overhead traveling hoist. The STUTZ PORTABLE PLATING BARREL is made in two sizes with cylinders having inside dimensions of 6" x 12" and 8" x 18". Also in half the diameter, 3" and 4" respectively. Cylinder can be partitioned. Standard perforations are 3/32" or larger. Smaller openings can be furnished as required. All gears are ½" High Temperature Lucite. Gear bearings are permanently lubricated. New heavy duty motor. Operating temperature up to 185° F.

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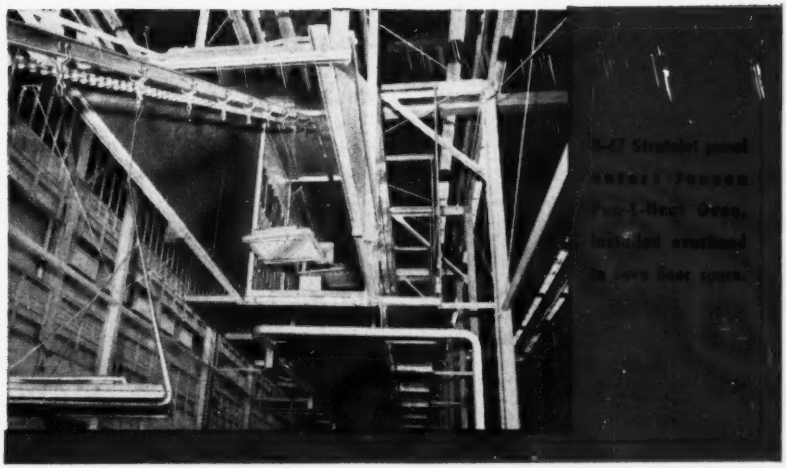
they can react to form a metallic phosphate bond and have been proved admirable for brass and copper, tin, chromium, stainless steel and even silver and gold.

The very nature of the two solutions which form the pretreatment primer makes it necessary that some elementary precautions should be taken during their preparation for use. The reducer or thinners should be kept in glass or stoneware containers, otherwise reaction between the acid constituent and metal can occur to the detriment of the material. In mixing, the reducer should be added to the resin medium with continuous stirring. The proportions should be exactly measured out, and thorough mixing must be ensured. A period of about 15 minutes after mixing should be allowed before use. In general the mixed medium must be all used within 8 hours. If kept longer, the butyral resin starts gelling without any apparent visual signs in the mixture but, if used in such a condition, adhesion (as shown by scratch and bend tests) will be very poor indeed.

In view of the instability of the mixed pretreatment primer solution, it may at first sight be thought that a ready-mixed preparation is not practicable. Such is not the case, however, and more recently single solution etch primers having the same type of formulation as the two-solution variety, have been successfully developed. In effect, they have to include an ingredient to prohibit the gelation of the polyvinyl butyral resin in the can during storage, and yet in no way interfere with the reactions that have to take place in the applied film. For example, an



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inhibitive solvent may be employed, such solvent disappearing rapidly during spraying or flashing off of the film.

Two ready-mixed pretreatment primers have been tested and found to give performance equal to that of the separate solution types. Moreover, they have been tested for storage stability by sealing in tinned iron containers and holding at 100 deg. F. to represent extreme storage conditions. Opened at monthly intervals up to a period of 6 months they were tested by spraying on to a series of metal panels (steel, brass, zinc plate and cadmium plate, and aluminum), and tested for adhesion before and after accelerated corrosion tests. The warm storage conditions were found to produce no degradation in quality.

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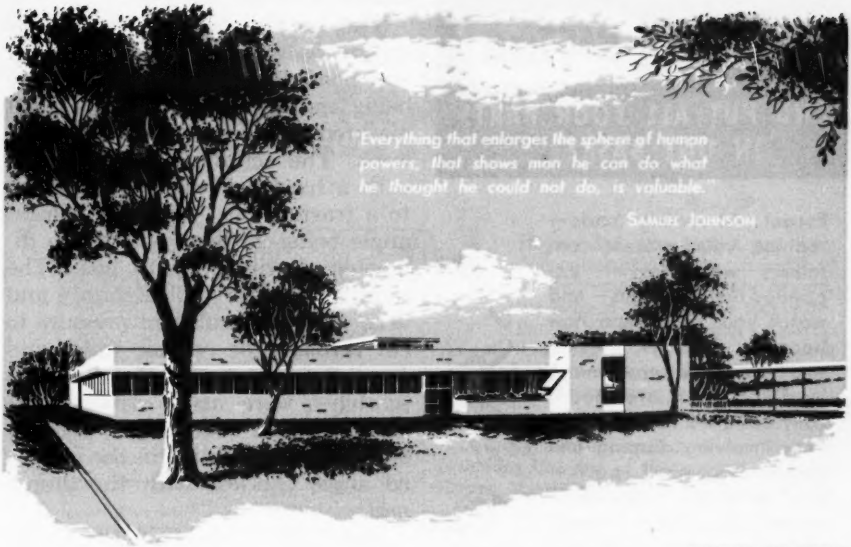
In the formulation of a successful butyral resin primer, a number of factors have to be given due care and consideration. The right grade of resin and the correct amount of water and phosphoric acid must be present for the base metal to which the primer is to be applied. For universal use on a range of metals, the optimum composition has to be developed for the purpose. Consequently, it is desirable that price per gallon should not be the only factor given consideration in purchasing a pretreatment primer, but selection should be made on a performance basis, judged from laboratory tests under humidity, salt spray and weather conditions.

A number of etch primers were tested. In this study, they were compared not only with one another, but also with good grades of baking red oxide and zinc chromate primers. The base material was deep drawing mild steel in the form of stampings. The parts were thoroughly cleaned by degreasing prior to painting.

The oxide and chromate primers were baked for 30 minutes at 250 deg. F., and the etch primers for 15 minutes at 250 deg. F. The finishing enamel employed was an ordinary good quality synthetic, also baking for 30 minutes at 250 deg. F., and light grey in color. Some test specimens were given one coat of primer and one of finishing enamel. Those having the conventional primers were duplicated on shot-blasted surfaces, using No. 32 crushed steel shot. The series was also repeated with two coats of finishing material. Finally the etch primer followed by chromate primer system was repre-


"Everything that enlarges the sphere of human powers, that shows man he can do what he thought he could not do, is valuable."
SAMUEL JOHNSON

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Out of Udylite's laboratories during the past quarter century have come a score or more major contributions to the art of electroplating. This pioneering has helped the plating industry to grow through the development of improved processes, more efficient equipment and supplies.

With its new research building, containing a complete pilot plant, six specialized laboratories and the complete metal finishing library, Udylite will expand its research at an accelerated pace, continuing as the source of new and better ways of metal finishing.

The industrial developments of the future are fast becoming problems of the present. The progress of the metal finishing industry in meeting these challenges is now more assured. For Progress moves through the people of research . . . and now Progress has a brand new "home."

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We GUARANTEE that replacement with NesTier baskets—regardless of how you transport small parts—will bring you a substantial saving in production costs, a saving you can't afford to miss. Two standard sizes in various sizes of mesh and perforated metal.

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sented in several samples.

The "as finished" quality of all specimens was assessed by scratch and bend tests for adhesion, these being applied after the finishes had matured at room temperature for a week. The scratches were applied with a hardened steel rod, tapered to a frustum of a cone, the conical angle being 15 degrees and the diameter of frustum 1/16 inch. The scratch tool was applied firmly and vertically with sufficient pressure to cut through the organic finish and down to the base metal. Two scratches were made crossing one another at an acute angle, and the adhesion of the finish in the included angle checked with the thumb nail.

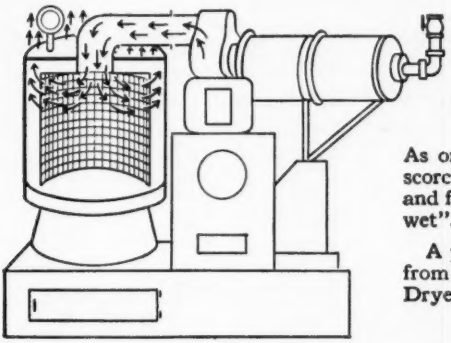
The bend test used a 3/16 inch diameter rod, the specimen being bent rapidly through an angle of 180 deg., with the finished side outwards. Specimens were cut from the formed parts for this test.

All etch primer samples were satisfactory on scratch test, the oxide and chromate primers being less so. All samples passed the bend test successfully.

All specimens were subjected to tropical condition testing, consisting of alternations of dry and wet heat. One day's dry conditions consisted of exposure for 16 hours to oven heat at 160 deg. F., followed by cooling in the oven to room temperature. One day's wet conditions consisted of submission to 100 per cent humidity at 160 deg. F. for 16 hours, followed by cooling off in the test chamber with moisture condensation on the specimens.

Table I shows method of sample preparation, lists results of initial adhesion tests, and describes final

EVER BLOW INTO AN ASH TRAY?



If you did, you saw a practical demonstration of the principle of air deflection. In old type dryers, air *blown* in from the top is deflected by the top layer of parts. As one user put it, "the top layer gets scorched, the next layer is nice and dry, and from there on down the parts are still wet".

A powerful suction fan *draws* the air from the bottom of the modern Nobles Dryer. Fresh air rushes in from the top to fill the vacuum and is drawn through the entire contents from top to bottom where it is expelled with the water.

Steam or electric heaters may be mounted compactly in the cover in contrast with space consuming, heat wasting, separate units connected by pipe.

An internal expanding, hydraulic brake stops the machine smoothly, and quickly. The "brake pedal" is a ring extending around the entire working area so that the machine can be stopped instantly from any working position. In the interest of faster drying and lower costs write today!

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Table I

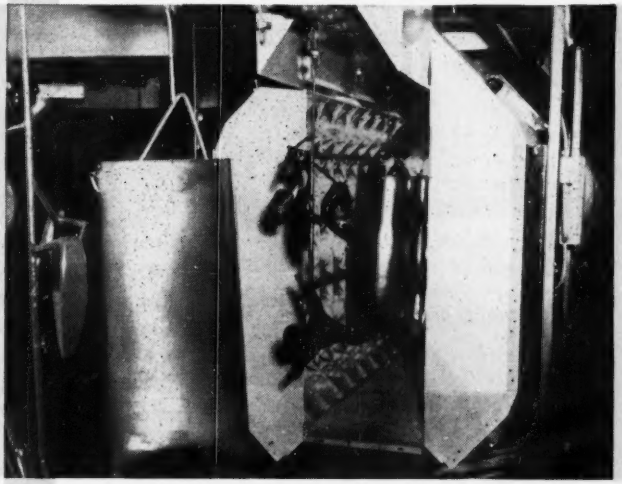
RESULTS OF TESTS ON ENAMEL FINISHES

Sample No.	Pretreatment	Baked Primer	Baked Finishing Enamel	INITIAL ADHESION		CONDITION AFTER 4 DAYS DRY HEAT AND 14 DAYS WET HEAT			
				Scratch Test	Bend Test	Scratch Test	Bend Test	Corrosion of Base Metal	General Remarks
1	Degrease only	Red Oxide	One coat	Poor, chipping	Satisfactory	Bad chipping	Cracking, flaking from base metal	Rust spots general	Adhesion, condition poor
2	"	Chromate A	"	Fair, slight chipping	"	"	"	Rust spots general, but superior to 1	"
3	"	Chromate B	"	Satisfactory	"	Chipping	Ditto, although superior to 1	No corrosion	Rather poor
4	"	Etch A	"	"	"	Perfect	Perfect	"	Condition very good
5	"	Etch B	"	"	"	"	"	"	"
6	"	Etch C	"	"	"	"	"	"	"
7	"	Etch D	"	"	"	"	"	"	Condition fairly good
8	"	Etch E	"	"	"	"	"	"	Condition very good
9	"	Etch F	"	"	"	"	"	"	"
1A	Degrease and Shot Blast	Red Oxide	"	"	"	Chipping at blisters	Cracking and flaking, but not as bad as 1	Heavy rusting	Condition very poor
2A	"	Chromate A	"	"	"	Some chipping	Cracking and easily removed with thumb nail	"	"
3A	"	Chromate B	"	"	"	Slight chipping	Cracking, no flaking	No corrosion	Condition fairly good
1B	Degrease only	Red Oxide	Two coats	Poor, chipping	"	Bad chipping	Cracking, flaking away	Rust spots	Condition very poor
2B	"	Chromate A	"	"	"	"	Flaking away completely	A few rust spots	Poor
3B	"	Chromate B	"	Fair, slight chipping	"	"	"	"	"
4B	"	Etch A	"	Satisfactory	"	Perfect	Perfect	No corrosion	Condition very good
5B	"	Etch B	"	"	"	Bad chipping	Cracks, easily removed by thumb nail	"	Condition fair
6B	"	Etch C	"	"	"	Satisfactory	Perfect	"	Condition fairly good
7B	"	Etch D	"	"	"	Chipping at blisters	Cracking, no flaking, easily removed by thumb nail	"	Condition fair
8B	"	Etch E	"	"	"	Perfect	Cracking, no flaking, not removable by thumb nail	"	Condition good
9B	"	Etch F	"	"	"	"	Cracking only	"	"
4C	Degrease only	Etch A and Chromate A	One coat	"	"	"	Perfect	"	Condition very good
5C	"	Etch B and Chromate A	"	"	"	"	"	"	"
6C	"	Etch C and Chromate A	"	"	"	"	"	"	"
7C	"	Etch D and Chromate A	"	"	"	Bad chipping	Top coats crack and flake away, etch primer quite sound	"	Condition good
8C	"	Etch E and Chromate A	"	"	"	Perfect	Perfect	"	Condition very good
9C	"	Etch F and Chromate A	"	"	"	"	"	"	"
4D	Degrease only	Etch A and Chromate B	"	"	"	"	Top coats, crack and can be scraped off, etch primer sound	"	"
5D	"	Etch B and Chromate B	"	"	"	"	Perfect	"	Condition good
6D	"	Etch C and Chromate B	"	"	"	"	As for 4D	"	"
7D	"	Etch D and Chromate B	"	"	"	Slight chipping	Cracks in top coats which can be scraped off, etch primer sound	"	"
8D	"	Etch E and Chromate B	"	"	"	Slight chipping of top coat	Cracks, no flaking, not removable by thumb nail	"	"
9D	"	Etch F and Chromate B	"	"	"	"	"	"	"

TAKES LESS SPACE

GREATEST PRODUCTION FOR OVEN SIZE • SHORTER BAKING CYCLES • SAVES COSTS

TYPICAL OF OVER 7,000 INSTALLATIONS—Pictured here is Fostoria oven at International Harvester Co., Richmond, Ind. Baking cycle for maroon color finish on cream separator parts is 11 minutes. Connected load 30 K. W. Oven is only 11 ft. long replacing old convection oven that occupied 480 sq. ft. with 1 hour baking cycle.



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Fastest heat transfer. Greatest output to input. Instant action.

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Most production for oven size. May be ceiling mounted.

Clean Operation
No by-products of combustion. No condensation.

Uniform Bake
Evenray heat distribution with thorough penetration.

Flexibility
Adaptable to any material, any shape, any color. Infinitely variable heat levels.

Safety Controlled
No warm-up, no shut-off lag. Instant heat control.

Less Maintenance
Lowest source replacement cost. Least efficiency loss.

Highest Efficiency
Less than 2% energy loss. Heats product — not oven walls.

Cuts Costs
Lowest "per piece" production cost. Competitive initial cost.

Reliability
Foremost engineering "know-how" and service.

Why handicap your production efficiency with obsolete equipment? Investment in modern, cost-cutting mechanization is today's necessity for industrial progress and profit. A typical example is the modernization of baking operations. Already over 7,000 plants have switched to the high efficiency Fostoria oven. Anything that can be baked, can be baked better, in less space, at lower cost with a Fostoria Engineered oven installation. Low energy loss; fast, uniform heat transfer; automatic controls and wide flexibility make Fostoria the most efficient of all industrial ovens. The extensive benefits of these advantages to your production are well worth your immediate investigation. Request the expert on-the-job assistance available to you by Fostoria field engineers. There is no obligation.

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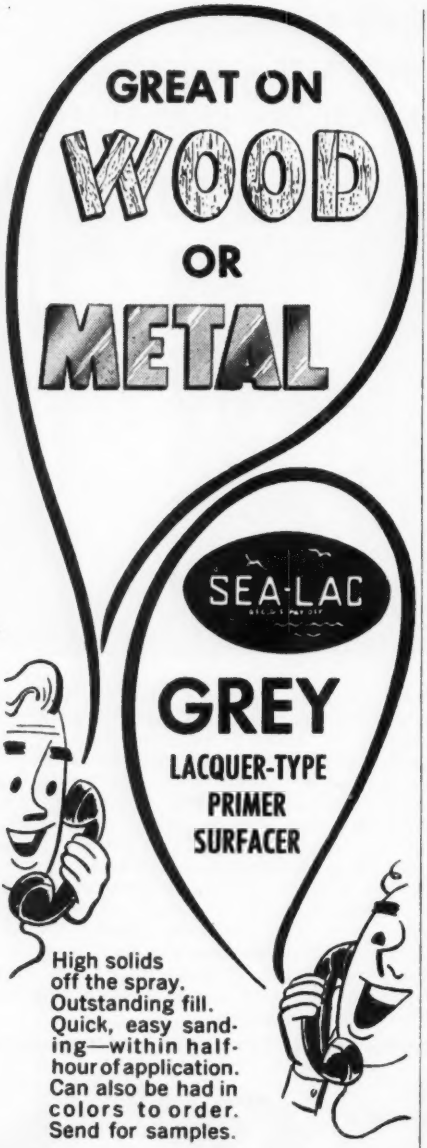
Send for complete facts

Write for this brochure of technical facts and case histories of many Fostoria oven installations. Tell us your particular problem and we will include data directly applicable to your operation.

INFRA-RED fostoria OVENS



conditions of samples after four alternations totaling 4 dry days and 14 wet days.

The changes in finish color and gloss are to some extent a baking reflection upon the quality of the finishing enamel and the efficiency of the baking operation, and under the test conditions are caused by the condensation and accumulation of water upon the film. Also, the tendency for the primer to hold moisture or to permit soluble matter to be leached out may assist in deterioration of the top film.

The first three samples shown in Table I indicate the need for a chemical pretreatment or its equivalent, but in comparing them, the superiority of the chromate type of primer is apparent. That illustrated by sample No. 3 is the better of the two chromate primers.

Samples Nos. 4 to 9 inclusive illustrate the merits of the pretreatment primers in providing for retention of adhesion and in fulfilling the roles of chemical pretreatment and first coating medium.

Samples Nos. 1A, 2A and 3A, show that some improvement results from mechanical roughening of the base metal by shot blasting, but they indicate that the benefit obtained is inadequate and not proportionate to the effort expended in plant, labor and cost for this additional preparatory operation.

With regard to the specimens having two coats of finishing enamel, Nos. 1B, 2B and 3B, show that the adhesion property is naturally not improved. The etch-primer samples Nos. 4 to 9, having the two enamel coats range from fair to very good, one only of them standing out at the

Specify Iridite . . . to meet military specs for corrosion protection during use or storage . . . for paint adherence . . . for low cost color coding . . . or to add quality and sparkle to your products. Here's how you can use Iridite:

ON ZINC AND CADMIUM you can get highly corrosion resistant finishes to meet any military or civilian specifications and ranging in appearance from olive drab through sparkling bright and dyed colors.

ON COPPER . . . Iridite brightens copper, keeps it tarnish-free; also lets you drastically cut the cost of copper-chrome plating by reducing the need for buffing.

ON ALUMINUM Iridite gives you a choice of natural aluminum, a golden yellow or dye colored finishes. No special racks. No high temperatures. No long immersion. Process in bulk.

ON MAGNESIUM Iridite provides a highly protective film in deepening shades of brown. No boiling, elaborate cleaning or long immersions.

AND IRIDITE IS EASY TO APPLY. Goes on at room temperature by dip, brush or spray. No electrolysis. No special equipment. No exhausts. No specially trained operators. Single dip for basic coatings. Double dip for dye colors. The protective Iridite coating is not a superimposed film, cannot flake, chip or peel.

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bottom of this scale.

The C and D ranges of samples were included because the pretreatment primer is usually regarded more in the pretreatment light than from the primer angle. It will be seen that both series 4C to 9C and 4D to 9D perform well.

Summarizing briefly, the performance of etch primers under hot damp conditions is thus established as very good. Further, the chromate primers in conjunction with etch primers give very good performance just as they do over chemically phosphatized surfaces.

FURNACE AND OVEN CONTROLS. The latest edition of **FURNACE AND OVEN CONTROLS CONDENSED CATALOG AND PRICE LIST 53-1**, available from **Minneapolis-Honeywell Regulator Company**, Industrial Division, Wayne and Windrim Avenues, Philadelphia 44, Pa., includes specifications and prices on temperature controllers, program controllers, combustion safeguard equipment, valves and accessories for furnace and baking ovens.

TURCOAT MATERIALS. PAMPHLET A-108, describing the complete line of Turcoating materials, is available from **Turco Products, Inc.**, 6135 South Central Ave., Los Angeles 1, Calif. The pamphlet contains full information on the six Turcoating materials, designed to fill every phosphatizing requirement and to meet applicable Government specifications.

The pamphlet includes a Phosphatizing Reference Chart which outlines the purpose of phosphate coatings, Government specifications met by Turcoating materials, recommended uses, methods of application, equipment required, metals which can be treated, coating weights in mg/sq. ft. and operation cycle.

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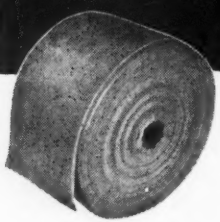

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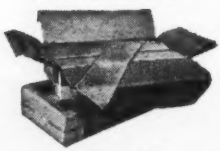

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No matter which way you buy it, you can be sure that every square inch will stay SOFT and TACKY until the very last bit is used up!

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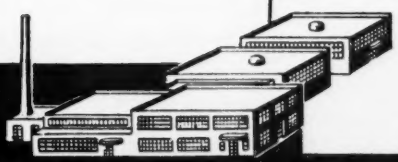

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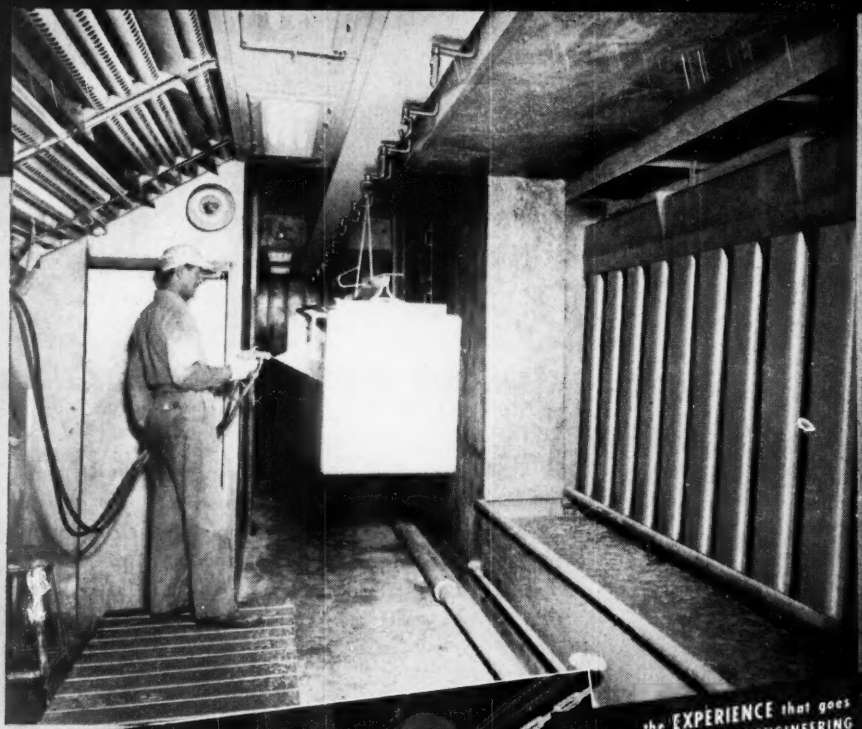

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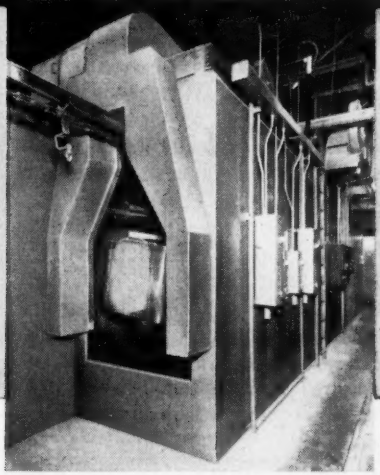

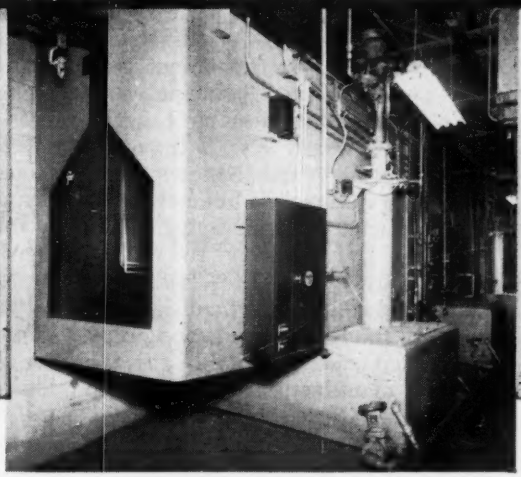

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AHON

Flat Polishing

By ADAM ZIMMERMAN

History

PRIOR to World War II flat polishing was done on reciprocating bed machines and was confined principally to the polishing of stainless steel sheets. Right after World War II the automobile industry changed the method of making automobile bumpers from hot forgings to cold stampings. This was due principally to radical changes in styling. Steel was very scarce and cold rolling facilities were taxed to the limit, thus leaving only hot rolled steels available for the bumper manufacturers. The radical designs plus the surface condition of the steel presented quite a problem, especially "cost-wise," in metal finishing prior to plating.

This led to consideration of prepolishing the steel before it was stamped. Production requirements were too high to consider reciprocating type machinery. What the automobile industry wanted was typical of the industry, a machine which would enable you to put the rough sheet in one end and remove the finished piece at the other end. This brought about the design of the "pinch-roll" or through feed type of machine. These machines vary in speed, depending upon application, from 2 f.p.m. (slab conditioning) to 250 f.p.m. (preparation for galvanizing). For metal finishing for decorative work the speeds vary from 20 to 60 f.p.m., depending upon production requirements.

Applications

PLATING. Flat polishing produces the primary requisite for good plating, uniform finish of base metal. Dependent upon plating technique used, finishes down to 4 rms can be obtained. The equipment is not affected by model changes or final shape of the piece.

PAINTING. Development work shows that prepolishing produces uniformly finer finish and provides a "tooth" for better paint adhesion. The resultant scratch pattern makes for easier blending during touchup and should reduce the amount of buffing necessary to produce deep luster.

SIZING. A "pinch-roll" machine can run anything from 2 feet in length up to coils. Where holding of size is important, this type of equipment can grind to tolerances of plus or minus 0.001 inch. At the present time saw blade stock up to 65 feet long is processed by this method.

Construction of Machine

The pinch roll type flat polishing machine is shown schematically in Fig. 1. The machine is designed for maximum flexibility.

The pinch rolls provide traverse motion to stock, and are equipped with variable speed drive so they can be run in either direction.

The contact roll drives the belt; the contact rolls are interchangeable. For heavy stock removal a small hard contact roll is used.

CHEMICALS ACP PROCESSES

PHOSPHATE COATINGS TO MAKE YOUR PRODUCT DURABLE*

PIONEERING RESEARCH AND DEVELOPMENT SINCE 1914

For more than a third of a century, ACP research chemists and ACP technical representatives in the field have pioneered in the science of metal preservation. They have developed surface treating chemicals which either protect metals directly, or create a superior bond for decorative and protective paint finishes, and now, ACP chemicals and processes are being used the world around to reduce costs, speed production and add to the life-span of countless products.

ACP metal protective chemicals include: protective coating chemicals for steel, zinc and aluminum; metal cleaners and rust removers; final rinse controls; pickling acid inhibitors; copper coating chemicals; soldering fluxes; alkali cleaners and addition agents; copper stripping and brightening solutions.

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"GRANODINE"® zinc phosphate coatings improve paint adhesion on automobiles, refrigerators, projectiles, rockets, and many other steel and iron fabricated units or components.

"LITHOFORM"® zinc phosphate coatings, make paint stick to galvanized iron and other zinc and cadmium surfaces.

"ALODINE"® protective coatings provide improved paint adhesion and high corrosion-resistance for aircraft and aircraft parts, awnings, wall tile, signs, bazookas, and many other products made of aluminum.

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"PERMADINE"® zinc phosphate coatings provide rust and corrosion proofing for nuts, bolts, screws, hardware, tools, guns, cartridge clips, and many other industrial and ordnance items.

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"THERMOIL GRANODINE"® manganese-iron phosphate coatings provide both rust proofing and wear resistance — anti-galling, safe break-in, friction on rubbing parts.

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"GRANODRAW"® zinc phosphate coatings make possible improved drawing, cold forming and extrusion on such steel products as sheets for stamping, bumpers, parts to be formed, prior to plating or painting, cartridge cases, etc.

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For fine finishing a large contact roll is used.

The billy roll is a steel roll which delivers the work pressure. This roll is actuated by an air cylinder, very finely controlled, so that any desired work pressure can be obtained. The billy roll is adjustable for crown cutting and can be removed fore and aft of center for fine finishing.

The head stock is mounted to a heavy cast iron machine frame and is adjustable up and down. The range of stock is from 0.015 to 3.00 inches.

The idler roll is equipped with stabilizers to minimize vibration and is interchangeable to compensate for belt length.

Oscillation of the belt is controlled by a scanning eye mounted behind the belt.

Principle of Operation

Flat polishing or prepolishing is a method of finishing the metal in the flat. By use of this process it is possible to produce a desired finish on the material prior to forming.

The work is performed by a belt and a series of rolls. The coated abrasive belt, dependent upon such factors as grit size and mineral type, has a wide range of performance from heavy stock removal down to fine finishes.

Evaluating the Belt

Since the tool used in flat polishing is a belt, it is important to know how a belt performs and how this performance can be measured. Obviously, a belt removes stock. Coarse belts remove a great amount of stock; fine belts produce fine finishes. Measuring stock removal by micrometer produced erratic results.

In order to change polishing from an art to a science, considerable testing was done. Early experiments showed that the following factors exercised the greatest influence on belt performance, and that when results were plotted, based on these factors, then direct comparisons could be made:

STOCK REMOVAL: For accuracy, the stock removal is determined by weight loss and is reported in terms of ounces per square foot. On scales graduated no finer than 1 oz., stock removal can be measured to 0.00015 inch when weight loss is converted from ounces to inches.

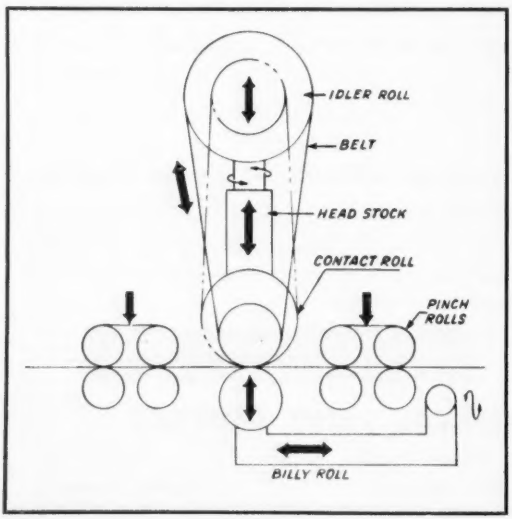

Figure 1

Schmieg CENTRI-MERGE Vertical Rotor Type DUST and FUME Eliminators

FOR THE MOST Economical COLLECTION and ELIMINATION Efficiency

An important new Schmieg development to wash hazardous dust and fumes from the air in a rotating torrent of water, combining the cyclonic principle of dust separation and *positive* high pressure water action.

Just a few of many reasons why a new Centri-Merge unit is your best investment in operating efficiency and economy:

• Low ratio of power to rated capacity • High ratio of water circulated to air volume handled • Independently driven low speed rotor and fan permit adjustments to load and operating conditions • No slots or nozzles to restrict water action • Automatic liquid level control • Optional location of air inlet arm • Material disposal by drag conveyor, hopper tank skim-off or manual clean-out • Easy access to clean-out doors for cleaning while unit is in operation • Bearings located out of liquid, fully enclosed, lubricated from outside.

Available in Two Types

1. For wet collection and elimination only.
2. For primary dry and secondary wet collection and elimination, with built-in dry type precleaner.

Capacities from 500 to 50,000 C.F.M.

THE *best* AIR PURGE is CENTRI-MERGE

Write or phone for Bulletin VU 8-53, describing the new Vertical Rotor Units. Then consult with Schmieg engineers to plan a Centri-Merge installation for maximum dust and fume collection and elimination efficiency in your plant.

Schmieg INDUSTRIES INC.

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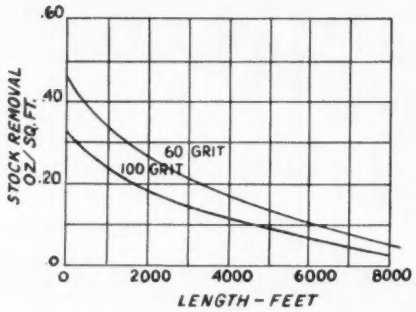

Fig. 2—The effect of belt wear on stock removal. Belt speed: 5,000 sfm; traverse: 45 fpm; hp: 1.81 inch.

HORSEPOWER PER INCH. The load supplied measured by ammeters as opposed to judging the spark stream.

PROFILOMETER. This measurement in micro inches, is an indication of the quality of finish. As the belt wears, the finish becomes finer.

LINEAL FEET. Generally the basis for all comparisons. The area is compensated for by belt width and area comparisons are used only in terms of cost.

In order to evaluate a belt during a test, all factors are held constant. The performance of the belt is plotted in terms of stock removal and profilometer, versus lineal feet, with the horsepower noted as shown in Figs. 2 and 3. The effect of horsepower on belt life is shown in Fig. 4.

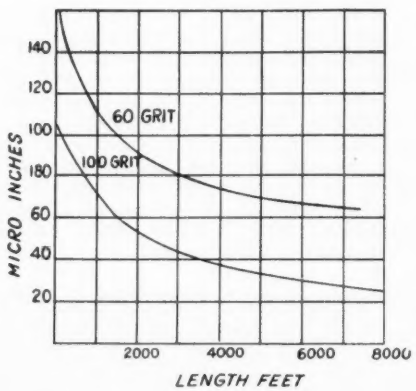

Fig. 3—The effect of belt wear on micro inch finish. Belt speed: 5,000 sfm; traverse: 45 fpm; hp: 1.81 inch.

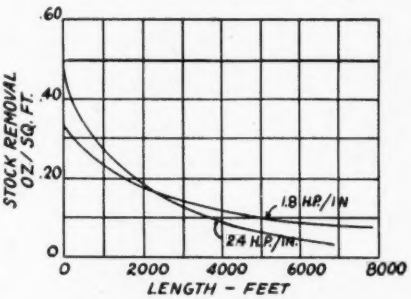

Fig. 4—The effect of horsepower on belt life. Belt speed: 5,000 sfm; traverse: 45 fpm; grit: 100.

It is important to note that as the horsepower is increased, the rate of cut is increased and, conversely, the belt life is decreased.

Actual tests have shown that the total amount of stock which is removed by a given belt is the same regardless of horsepower. The rate of removal, of course, varies with the horsepower applied.

The unformity of the factory coated abrasives is such that a set of standard curves can be used with remarkable accuracy.

Selecting the Sequence

Before selecting a grit sequence

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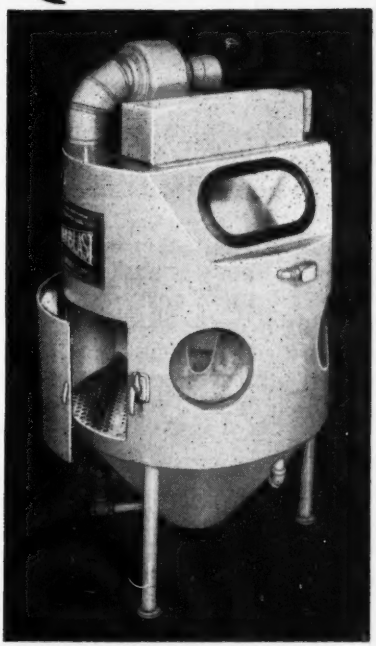

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two factors must be considered.

1. In what condition is the steel?
2. What plating sequence is to be used?

The first thing to do is to determine how much stock must be removed to remove the surface imperfections. This can be readily accomplished by polishing representative samples until they are cleaned up and determining the necessary stock removal by measuring the weight loss. When this value has been established the optimum belt sequence can be determined from the belt evaluation charts.

The main objective in selecting a sequence is to maintain the stock removal as near constant as possible, yet sufficient to clean up the sheet. Constant stock removal is obtained by shifting belts, using at least two heads.

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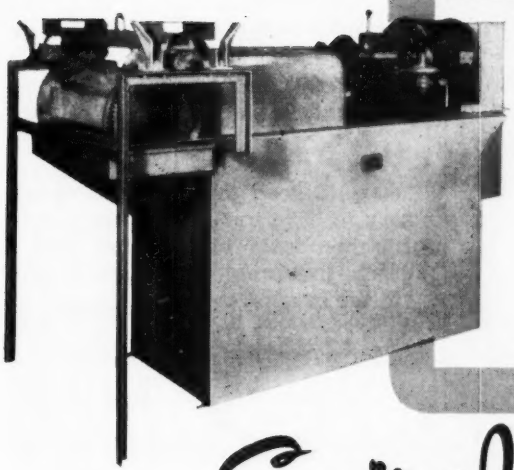
For example, assume it was necessary to remove 0.30 oz. per sq. ft. to clean up. A new 100 grit belt is capable of removing 0.32 oz. per sq. ft. after 10 lineal feet, and 0.11 oz. per sq. ft. after 4,000 lineal feet. On a two-head setup this would have a range of stock removal from 0.64 oz. per sq. ft., (twice the necessary amount) down to 0.22 oz. per sq. ft. (less than the required amount). Using this setup, with both machines using new belts simultaneously 30 per cent of the stock would be rejected. The profilometer reading would vary from 100 to 38 micro inches and a highly erratic finish would result.

By using a system of belt shifting the stock removal would range from a high of 0.42 oz. per sq. ft. to 0.33 oz. per sq. ft., and the stock removed in each case would be high enough to clean up and produce the lowest micro inch finish.

The profilometer would never be any greater than 38 micro inches. (Other test work has shown that in order to reduce a 90 micro inch reading to 10 micro inch, the life of a 150 grit belt would be only 1,000 feet as compared to a belt life of 6,500 feet when reducing a 38 micro inch reading to 10 micro inch.)

Figure 5 shows standard performance curves of various grit sizes. Table I is a chart listing stock removal in ounces and corresponding profilometer reading as a belt wears.

The plating sequence used largely determines the required finish; a rule of thumb (varies somewhat dependent upon the shape of piece and so forth) is as follows:



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Lasalco's *NEW* Spiral Dryer

SPECIFICATIONS

Size:	Length 9'0"—Width 2'8"—Height 6'0"
Drum Size:	22" Diameter—72" long—8" screw
Drum Perforations:	¼" (other sizes available)
Drum Speed:	3½ R.P.M.—2 R.P.M.—1.1 R.P.M.
Drying Time:	1.8 min.—3 min.—6½ min.
Production:	450 to 1600 quarts per hour (60 to 213 cu. ft.)
Drive:	⅔ H.P.—220/440 v., 3 phase, 60 cycle
Discharge Chute:	20" from floor (minimum)*
Loading Chute:	42" from floor (minimum)
Heater:	Gas—250,000 B.T.U. complete with spark ignition, safety shutoff valve, pilot solenoid and pressure regulator. A flame-protecto-relay with flame rod and rectifier head is furnished for flame failure protection. Dryer also available with steam blast coils and blower.

*Can be arranged for any height from tote pan to 55-gal. drum.

- No matter how intricate the design, recesses or contours of the parts, the 3-speed spiral through this hot air blast will completely dry up to 1600 quarts an hour—AUTOMATICALLY!
- From one-half to two-thirds of each man's time, now spent on drying operations, can be saved.
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Table I

BELT PERFORMANCE

Length	1,000 ft.		2,000 ft.		3,000 ft.		4,000 ft.		5,000 ft.		6,000 ft.		7,000 ft.		8,000 ft.	
	oz.	Micro	oz.	Micro	oz.	Micro	oz.	Micro	oz.	Micro	oz.	Micro	oz.	Micro	oz.	Micro
60	.37	125	.29	90	.23	80	.18	72	.14	67	.10	62				
80	.33	110	.26	77	.20	62	.15	55	.12	48	.09	46				
100	.27	70	.20	50	.15	44	.13	38	.10	35	.08	32	.07	30		
120	.22	48	.17	34	.12	27	.10	23	.07	21	.05	20				
150	.17	34	.13	22	.10	17	.07	15	.06	14	.05	13	.04	12	.03	10

Belt Performance — 1.8 hp/inch 45 ft./min.

Type of Plate	Required Finish
Buffed copper plus bright nickel	12-15 rms
Buffed nickel only	8-10 rms
Gray nickel plus bright metal	4-7 rms
Bright nickel only	steel buff

Finishing

To do good finishing it is necessary to have some understanding of the mechanism of finishing.

The first problem is to understand the effect of previous roughing grits.

Fig. 5—Effect of belt wear on stock removal. Belt speed: 5,000 sfm; traverse: 45 fpm; hp: 1.81 inch.

Belt evaluation tests showed that as the belt wore the finish became finer. Belt shifting, in addition to raising the average amount of stock removed, tends to present a finer finish to the finishing belts, resulting in less work and longer life for the finishing belts.

A study was made relative to the amount of work which would be necessary to effect a change in profilometer reading. Panels were polish-

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ed and samples ranging in profilometer from 100 rms down to 10 rms were selected. The selected samples were carefully weighed and then were cross-polished until all of the original scratches were removed, at which time the samples were weighed again to determine the stock removal necessary to effect a change in profilometer. The results of these tests are shown in Figure 6.

The difference between a 10 micro inch reading as produced from a worn out 100 grit belt and a 10 micro inch reading as produced from a 220 grit belt is the number of lines per inch, in other words a fine belt produces a very dense scratch pattern which tends to be more uniform and when plated, results in a "scratch free" appearance.

Another important factor relative to finish is the manner in which a mineral wears on a belt. There are two types of minerals generally used, aluminum oxide and silicon

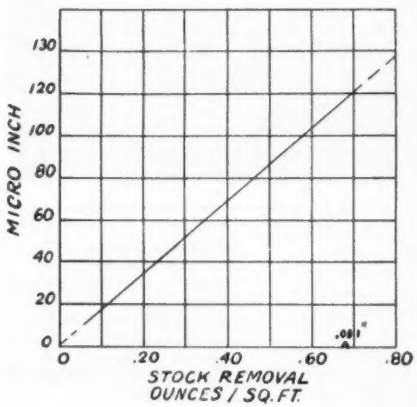

Fig. 6—The amount of work necessary to effect a change in micro inch readings.

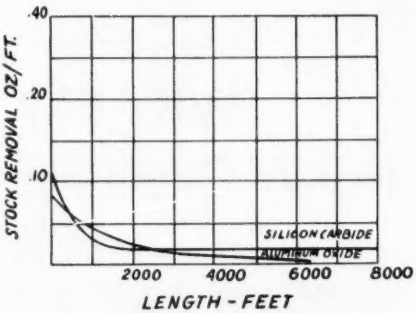

Fig. 7—The cutting characteristics of silicon carbide as compared with aluminum oxide.

carbide and the wearing characteristics are vastly different. Aluminum oxide is a tough mineral which wears from a sharp point to a dull blunt point. This mineral wear produces a wide gap between peaks and is difficult to cover with subsequent plate. Sometimes it manifests itself in "comets" or wild grit lines. The toughness of aluminum oxide can stand extremely heavy work loads and is excellent for heavy duty work such as stock removal.

Silicon carbide is a hard friable material which wears by fracturing, always maintaining a sharp cutting edge. This ability of silicon carbide to fracture produces a clean, sharp scratch. The groove is relatively narrow and the finish as produced by this material is readily "scratch free" after plating.

Figure 7 shows the comparison between aluminum oxide and silicon carbide minerals. The dulling action of the aluminum oxide shows on the graph by a constantly decreasing rate of stock removal. The fracturing ability of silicon carbide is borne

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out by the constant rate of stock removal, as shown in the graph.

It is the dubbing of the mineral when using aluminum oxide which accounts for the controversy in the

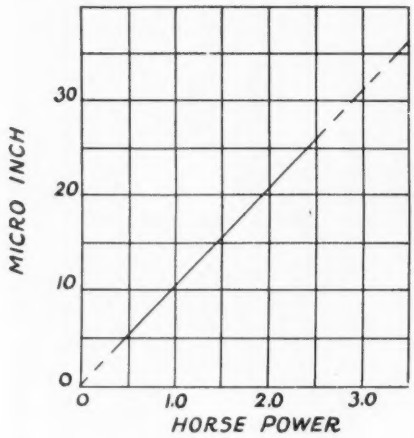


Fig. 8—Effect of increased hp on micro inch readings. Belt speed: 5,000 sfm; belt: 150 grit silicon carbide.

finishing department when a low profilometer finish fails to produce a satisfactory finish after plate. Silicon carbide, although it finishes much finer, has the drawback that excessive work pressures cause excessive shelling and materially reduce the life of the belt. That is why silicon carbide generally fails on such operations as hand polishing. In order to use silicon carbide successfully in flat polishing it is very important that a proper roughing sequence is used and that the finish of the stock after it leaves the last roughing head is as low as possible. This is best obtained by rotating the belts. Silicon carbide, when used with light work pressures (applicable only with a properly conditioned roughing operation) will give excellent belt life and may outlast a similar grit size in aluminum oxide by as much as 4 to 1.

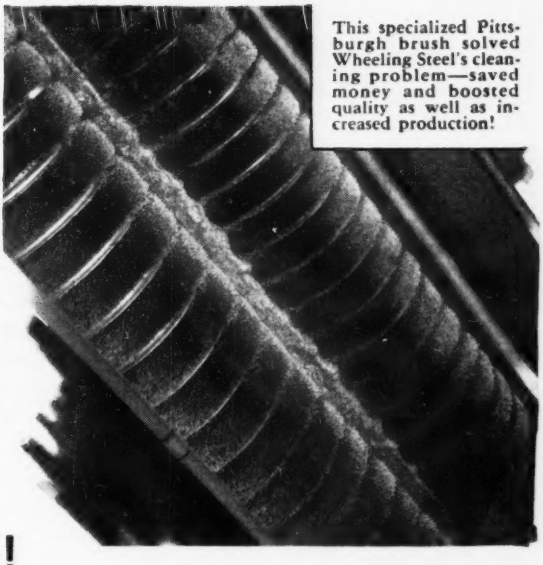
Because the mineral remains sharp and the resultant grooves are narrow, silicon carbide generally finishes about 2 grit sizes finer than aluminum oxide minerals. As shown in Figure 8 the resultant finish obtained from silicon carbide is directly proportional to the horsepower applied. In order to obtain fine finishes it is necessary to use light pressures. On tandem units this is accomplished by holding the horsepower progressively less on each stand. This system enables the belts to remove enough stock to clean up the effects of the roughing operation and produce a controlled finish. The required finish is controlled by the plating process used and by the contours of the object.

Finish is affected by scratch length—a function of traverse speed. Generally the slower the traverse speed, the shorter the scratch length and the finer the resultant finish. Traverse speed is usually dictated by production requirements and some relief is obtained by polishing over a crown. The crown effect is obtained by raising the billy roll above the pass line.

Effect of Rubber

The contact roll plays an important part in flat polishing. Its primary function, of course, is to drive the belt. In addition to motivating the belt the contact roll has considerable influence on the performance of the belt.

ROUGHING. For heavy stock removal a hard contact roll with a



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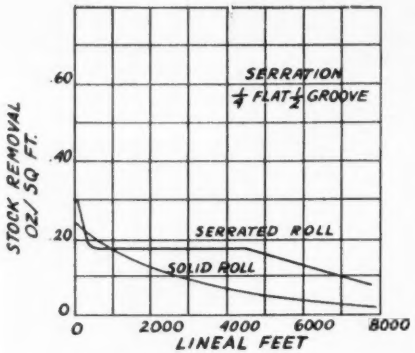


Fig. 9—The effect of serrating a contact roll on the ability of a belt to remove stock. Belt speed: 5,000 sfm; traverse: 45 fpm; grit: 100.

small diameter is used. The durometer reading of the rubber roll ranges between 65-80 and the diameter of a roughing roll is generally 8-9 inches. Aluminum oxide grit loses its cutting ability during use, and a properly designed contact roll can cause the mineral to shell and regain its cutting ability.

Figure 9 shows the effect of contact roll design. This increased cutting ability was brought about by serrating the contact roll.

FINISHING. For fine finishing soft contact wheels are needed. This is especially important when using minerals such as silicon carbide. Experiments have shown that a larger contact roll will produce a finer finish, all other factors being equal. A 12 inch diameter contact roll is generally used to produce a fine finish.

Figure 10 shows the effect of roll diameter on resultant finish. A large soft contact roll will minimize, by its cushioning action, lap marks due to belt splice.

Rubber Contact Wheel Applications

The requirements in patterns to attain top efficiency in the working surface behind a belt have been compiled as follows:

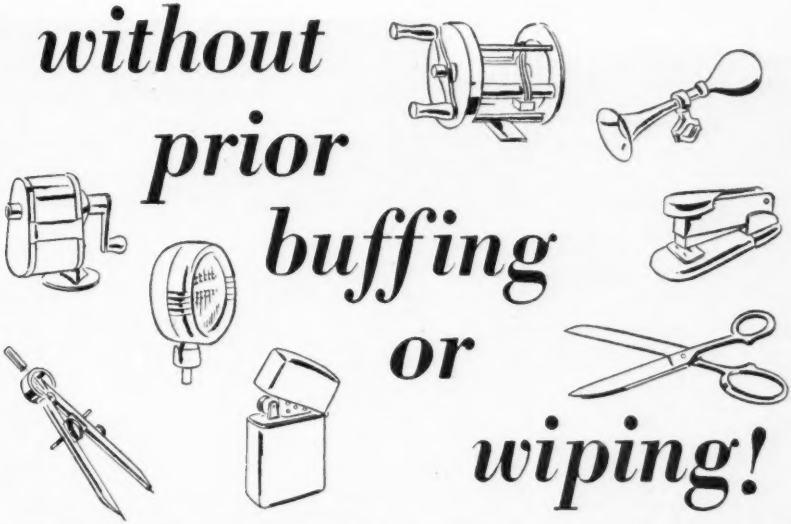
To Correct	Harder Density	Wider Slots	Smaller Flats	Deeper Slots	Slots Smaller	Softer Density	Higher Speed
Glaze	*	*	*				
Loading		*	*				
Too Aggressive					*	*	
Too Slow Cutting	*	*	*				*
Too Deep Scratches					*	*	
Burning Part	*			*			
Too Solid for Contour			*	*	*	*	
Dubs Edges	*						
Orange Peel	*		*		*		
Shedding Mineral					*	*	*
Chatter			*		*	*	*
Overlap Marks			*		*	*	

The smooth face wheel is made in the soft densities for greasing out and for contour work. We recommend the serrated face over the smooth wherever possible, since a belt cost saving results. More parts can be produced with a serrated face contact wheel, and faster stock removal on heavy grinding can be obtained by controlling the action

to page 74 →

and so to chrome . .

without prior buffing or wiping!



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Where specific thicknesses of bright nickel are desired, use Seymour "NC" or "CK" Bright Nickel Processes in a warm plating bath. The warm type brightener solution permits specification barrel nickel plating of any desired deposit from .0002" to .0010", and at a speed four to six times faster than with a cold solution.

Seymour solutions are also available for cold plating baths where a deposit of about .0001" maximum is desired. Both warm and cold type brighteners are simple to maintain and easy to control. Deposits are adherent to properly cleaned base metals, except zinc base direct, and may be chromium plated without prior buffing or wiping. Write for complete information.

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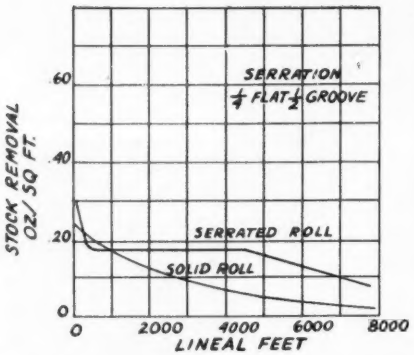

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Dubs Edges	*						
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Chatter			*		*	*	*
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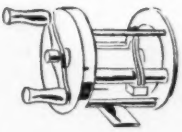

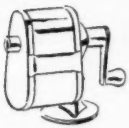

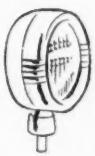

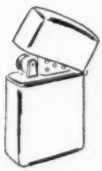

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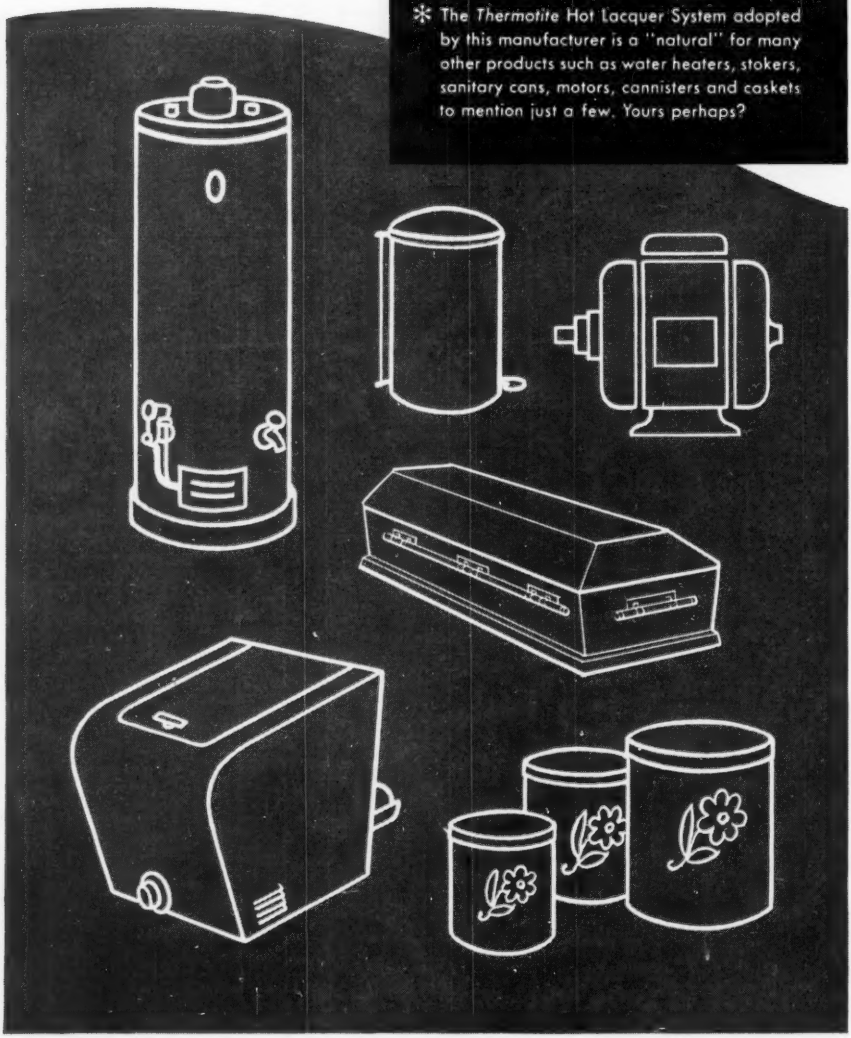
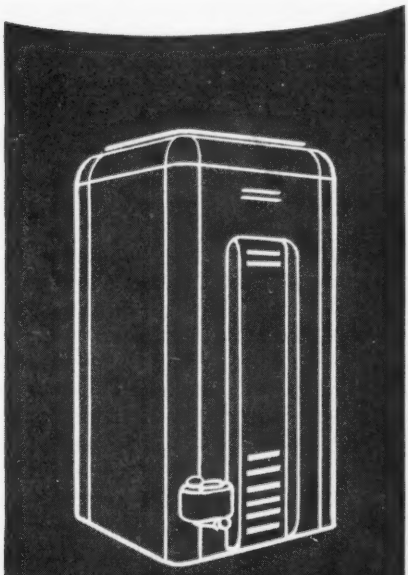


solves production bottleneck

by cutting drying time 600%

This manufacturer of gas and oil furnaces was using a finishing system which produced highly satisfactory results from every standpoint of gloss, adhesion, appearance and durability. It was necessary, however, to move finished parts from the line to a storage place for an hour's drying time before handling and packing—a costly production bottleneck. A Lowe Brothers "Finishing Specialist" recommended *Thermotite* as a means to eliminate this bottleneck yet retain all of the desirable characteristics of the finish used previously.



NOW, with *Thermotite*, parts are dry, ready for packing within 9 minutes! Packing is done just as pieces leave the production line. No extra handling, no moving, no special storage, no costly bottleneck—just big savings!

BUT MOST IMPORTANT, the "hot application" method recommended by Lowe Brothers "Finishing Specialist" produces a finish with every desirable characteristic of the former system—good build, excellent adhesion, one coat application and a tough, durable high gloss film, free of marring!

MANY manufacturers have found it most profitable to have a Lowe Brothers "Finishing Specialist" check their finishing operations for possible improvement based upon thorough knowledge of the latest in modern systems and materials. How about you? No obligation—write today!

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This advertisement is based on facts from Lowe Brothers industrial case history files.

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desired with the proper pattern and density on the face of the wheel. On hand operation, fatigue is cut to a minimum because the working face will do the largest share of the work, reducing the effort required from the operator.

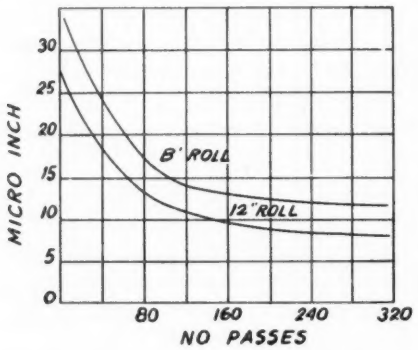

Fig. 10—A comparison of micro inch finishes obtained through use of an 8-inch roll and a 12-inch roll.

Wet Versus Dry Polishing

In order to evaluate wet versus dry polishing one must consider several factors, such as:

1. Effect of horsepower.
2. Effect on finish.
3. Nature of materials.

EFFECT OF HORSEPOWER. With work loads of up to 1.5 horsepower per inch, the wet process holds a slight edge in its ability to remove stock. However, due to the lubricity of the coolant it is difficult to exert greater work pressures on a wet machine because of slippage. Using a dry process it is possible to apply work pressures up to 2.5 to 3 horsepower per inch. Higher polishing pressures effect greater stock removal. It is the holding ability of the pinch rolls that influences the ability to cut stock rather than the difference in the use of coolants. This argument is borne out in coil polishing, where the traverse motion is controlled by tandem equipment such as payoff reels and coilers.

The wet process is preferred on light gauge materials because of the danger of overheating (caused by excessive pressures) which results in aging and buckling.

EFFECT ON FINISH. When finishing with silicon carbide both processes are about equal. Using silicon carbide requires light work loads and the shelling action of the mineral keeps the belt clean.

When evaluating a belt coated with aluminum oxide (used for stock removal) and comparing wet with dry, consideration must be given to finish. A wide groove appears as a "comet" or "wild grit line" after plating. When using a dry belt, a phenomenon known as metal pickup will occur as the mineral gets dull. Metal pickup on belts is similar to wheel loading in that tiny particles of the metal weld themselves to the mineral. As a result the mineral cuts a wider and deeper groove. The work load on the finishing belts is thus increased and the roughing belt therefore becomes ineffective.

The use of lubricants extends this metal pickup point as much as 3 times. The metal pickup point compensates for the difference in cost of paper and cloth belts.

NATURE OF MINERALS. Carbon steels, depending upon such contingencies as stock removal required, gauge and so forth, can be polish-

How a Fosbond cycle including Actidip can

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If Your Company Now Applies Zinc Phosphate Paint-Bonding Coatings, This Is "Must" Reading For You!

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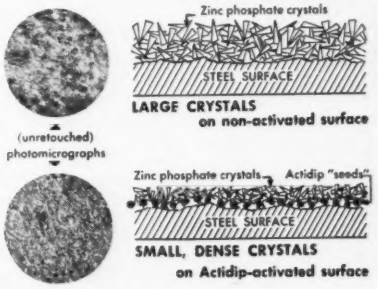

How Actidip Works

Zinc phosphate crystals begin "growing" on steel from a starting point or nucleus. On a non-activated surface, growth is uncontrolled. Result: large crystals, high consumption of phosphatizing solution, irregular surface requiring more paint to cover.

Actidip "seeds" the surface with thousands of nuclei. Result: a smaller crystal structure; a minimum of solution to coat surface (up to 40% less); equal or better corrosion resistance; less paint to cover—or smoother finish with same amount.

The use of Actidip on certain steel surfaces which won't take an adherent phosphate coating has actually made it feasible to produce good coatings on these surfaces.

Actidip is applied by spray or immersion—by itself or compounded with a Pennsalt Cleaner. For best results, Actidip should be used in a Pennsalt-designed Fosbond cycle.

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Actidip is a Pennsalt trade mark

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ed either wet or dry. Copper, brass, aluminum and stainless alloys must be polished wet, because of their tendencies to load the belt.

Adapted for publication in PRODUCTS FINISHING from a paper presented at the February, 1954, meeting of the Detroit Section, Society of Automotive Engineers.

CELLULOSE ACETATE. A new edition of a basic technical booklet about the properties and uses of cellulose acetate is now available from **Hercules Powder Company,** Wilmington, Delaware.

In the section devoted to discussions of properties, the material has been revised to include data on the many new solvents, plasticizers and resins which are used with cellulose acetate.

The section on uses includes considerable new information about acetate specialty lacquers including starting formulas for clear and pigmented outdoor lacquers, heat-resistant paper lacquer, greaseproof wallpaper lacquer, plastic coatings, and dipped lacquers.

PROPELLER FAN BULLETIN. Three new models are among the thirteen types of fans pictured in **BULLETIN A-109** available from **Hartzell Propeller Fan Co.,** Piqua, Ohio. The additions to the Hartzell line are a panel fan, a high pressure fan and a direct-drive Lo-Noise fan. The bulletin also describes three types of roof ventilators, unit heaters and intake air units.

The 40-page book includes specifications, dimensions and performance figures on all of the equipment, plus valuable engineering data. A special feature is a discussion of corrosion-resistant materials and coatings which includes a table showing the suitability of special materials and coatings for use in a wide variety of fumes commonly encountered in industrial installations.

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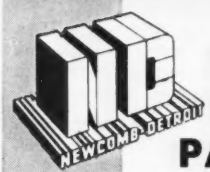

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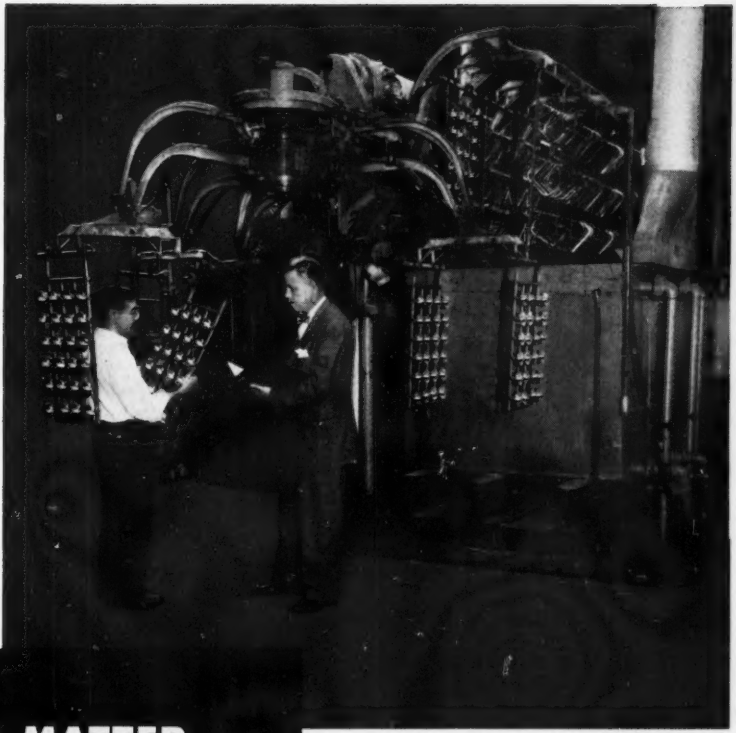

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The Finishing of Aluminum

Structural Features of Oxide Coatings on Aluminum

SOME interesting details of the structure of anodic coatings on aluminum have been described by F. Keller, M. S. Hunter, and D. L. Robinson in J. ELECTROCHEM. SOC., 100, 411 (1953). They suggest that anodic coatings, which can be produced in a wide variety of electrolytes under a wide range of operating conditions, may be classified on the basis of the extent of the solvent action on the oxide of the electrolyte in which it is produced. In electrolytes containing boric acid, which have little or no solvent action on the oxide, the coatings are thin, non-porous, and have a thickness proportional only to the applied voltage. This is called the "barrier" or "blocking" type of coating; its thickness is about 14 Angstrom Unit per volt applied; and its unique electrical properties make it suitable for use in electrolytic capacitors and rectifiers. In electrolytes containing sulfuric or chromic acids, which appreciably attack

Dr. Seymour Senderoff
Supervisory Chemist,
Electrodeposition Section
National Bureau of Standards

A Monthly Digest of Current Technical Progress Indicating Significant Trends and Developments in the Finishing Industry

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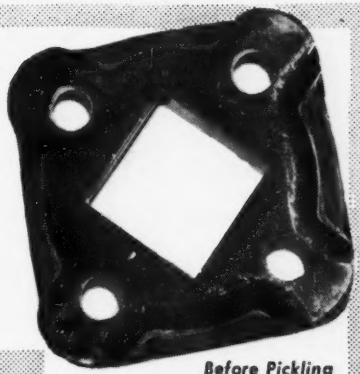
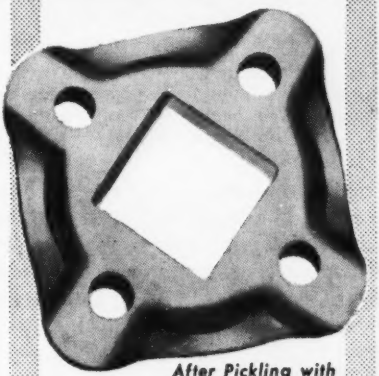


Before Pickling



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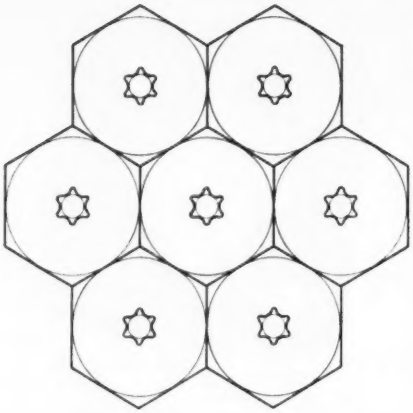

Fig. 1—Relation between ideal cylindrical oxide cells with cylindrical pores and close-packed hexagonal cells with star-shaped pores.

the oxide, the amount of oxide formed is usually a function of current and time, and so considerable thickness may be obtained. The decorative and protective oxide coatings usually used on aluminum are of this type, and it is with this type that the authors are primarily concerned.

The process of formation of coatings of the latter type is rather complex. It is deduced on theoretical grounds that the simultaneous formation and solution of coating which occurs in these electrolytes should produce a cellular coating with each cell having at its center a pore. Initially, the cells and pores are cylindrical, as shown in the light lines of Fig. 1, but with continued action the cells assume a hexagonal cross-section and the pores become star-shaped, as shown by the dark lines of this figure. By effective application of the electron microscope and special replica techniques, the authors have been able to demonstrate that this theoretical picture is borne out in fact, and they were able, at the same time, to measure cell sizes and pore sizes under various conditions.

After forming an anodic oxide coating on aluminum, stripping it without affecting the base metal, forming a replica of the surface from which the oxide had been stripped, and finally separating the replica, the authors prepared the electron micrograph of the replica which is reproduced in Fig. 2. The top of Fig. 2 shows the hexagonal shape of the oxide cells and the bottom of the figure, which is a cross-section of the surface, shows that the base of each cell approaches a spherical section in shape.

Figure 3 is an electron micrograph of the cell base structure of a coat-

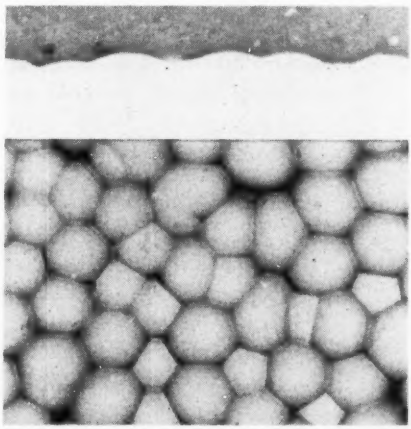

Fig. 2—Cell base pattern of 120 volt phosphoric acid coating showing hexagonal cell structure (top), and contour of cell base (bottom). Electron micrograph. Oxide film replica. Magnification 35000 X.

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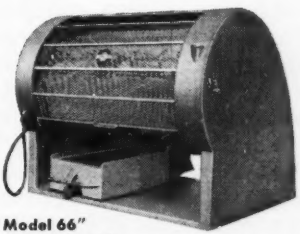

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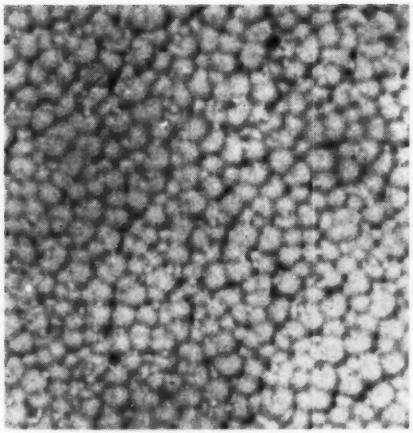

Fig. 3 — Cell base structure of 30 volt phosphoric acid coating. Electron micrograph. Oxide film replica. Magnification 35000 X.

ing formed at a lower voltage. The smaller cell size is noted. At this voltage, the initial pore-free barrier layer was thin enough, so that a transmission micrograph through the oxide layer itself showed the pore structure. The transmission micrograph showed that there are as many pores as cells and that the cell size and pore spacing are the same. This confirmed, qualitatively, the theoretical picture deduced for the oxide cells; namely, that each cell is a hexagonal prism with a spherically shaped base, and contains a central pore which does not penetrate the full length of the prism.

The authors then undertook quantitative measurements of the cell dimensions as they are affected by various operating conditions in different electrolytes. Figure 4 shows the cell size of oxide coatings produced at various voltages in 4 per cent phosphoric acid. When the cell sizes are measured and plotted against the forming voltage a straight line is obtained which does not pass through the origin, but has a value of 330 Angstrom Units at zero voltage. Such a plot would be obtained if the thickness of the oxide cell wall increased linearly with voltage, but the pore diameter remained constant. In that case the intercept at zero volts (330 Angstrom Units) would represent pore diameter.

Since the cell size and shape can be determined from the electron micrographs, and the pore diameter from the plot of voltage versus cell size, all the information is available to construct a scale model of the oxide coating under any given operating conditions. This was done

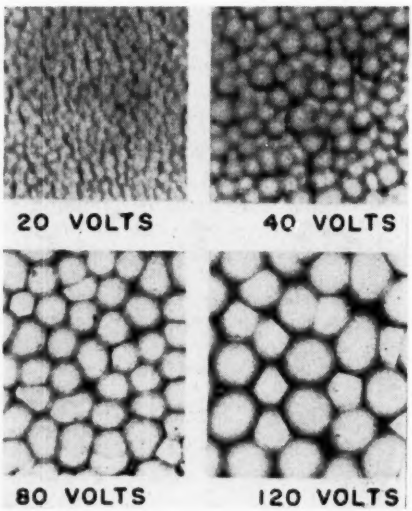

Fig. 4 — Cell base patterns of coatings formed in 4 per cent phosphoric acid electrolyte showing increase in oxide cell size with forming voltage. Electron micrograph. Oxide film replica. Magnification 35000 X.

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Table I

PORE DIAMETER AND WALL THICKNESS VALUES OF OXIDE COATINGS

Electrolyte	Pore Diameter, Angstrom Unit	Wall Thickness, Angstrom Unit/Volt
4% Phosporic acid, 75 deg. F.	330	10.0
2% Oxalic acid, 75 deg. F.	170	9.7
3% Chromic acid, 100 deg. F.	240	10.9
15% Sulfuric acid, 50 deg. F.	120	8.0

for the 120 volt phosphoric acid coating and is shown in Figure 5.

Similar measurements were made for various other electrolytes and it was found that the relationship between cell size, pore size, and forming voltage was the same for all electrolytes, but the values of cell size and pore diameter differed in the various electrolytes. The authors concluded from these measurements that the pore diameter is determined by the electrolyte and is not affected by the forming voltage. The wall thickness is determined primarily by the forming voltage, but it is also dependent upon the electrolyte because the thickness of oxide built up per volt of applied potential differs from electrolyte to electrolyte.

Since the cell size is the sum of the pore diameter and twice the wall thickness, it is determined by both the electrolyte and the forming voltage. Table I shows the dimensions found for the oxide cells produced in the four anodizing solutions studied. The cell size is obtained for any forming voltage by the formula, $C = 2WE + P$, where C is the cell size, W is the wall thickness in Angstrom Unit per volt characteristic of that electrolyte, E is the forming voltage, and P is the pore diameter of that electrolyte.

The small size of these cells can be appreciated when one calculates the cell sizes, as the authors have

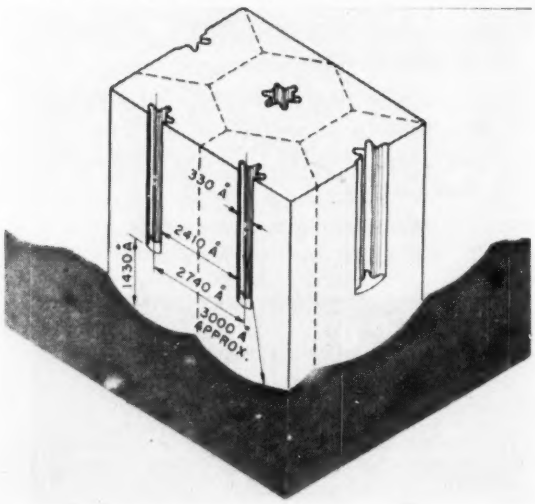

Fig. 5 — Structure of 120 volt phosphoric acid coating constructed on cross-section of cell base pattern. Dimensions of pore, cell, cell wall, barrier, and radius of curvature are shown. *(Illustrations courtesy The Electrochemical Society, New York, N. Y.)*

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done, from the data of Table I. Within the range of 15 to 60 volts in each of these electrolytes, the number of cells per square inch varies from about 25 by 109 to 500 by 109. It was also observed that the thickness of the initial pore-free barrier layer formed in each of these electrolytes is about 10 to 25 per cent greater than that of the wall thicknesses shown in the table.

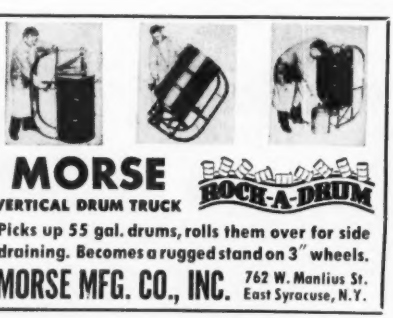
The information presented by the authors enables one to calculate the pore volume of any of the coatings. It is clear that pore volume decreases with increasing forming voltage. If one assumes that the pores are circular, then the pore volume may be obtained by the formula, $V = 78.5\ P^2/C^2$, where V is the pore volume in per cent, P is the pore diameter, and C is the cell size.

In discussing the significance of the results of this work, the authors point out that this data on the structures and dimensions of porous oxide coatings may be used to formulate combinations of electrolytes and forming conditions which would produce oxide coatings having certain specific desirable characteristics for particular applications. The behavior of this type of anodic coating is a function of four variables: pore size, cell wall thickness, the barrier thickness at the base of the pore, and the character of the oxide. The authors did not discuss the last variable in this paper.

Of the dimensional variables, they showed that the barrier thickness and cell wall thickness are primarily a function of the forming voltage; that they cannot be greater than 14 Angstrom Unit per volt, and are actually less by a factor depending on the nature of the electrolyte. Pore size was shown to be a function of the electrolyte and independent of the voltage.

They indicate that the effectiveness of a sealing treatment is determined by pore size, and that coatings with large pores, such as those obtained from phosphoric acid solutions, do not seal well in boiling water. Large pore size is desirable, however, if one wishes to electroplate over the anodic coating. To develop hardness and wear resistance in a coating, one requires smaller and fewer pores. This can be obtained at high voltages with an electrolyte which produces small pores. Since a corrosion resistant coating also requires few and small pores, and in addition, as thick a barrier layer as possible, it may also be produced under high voltage conditions in similar electrolytes.

Keller, Hunter, and Robinson have ably demonstrated the application of a new tool to the solution of a complex, interesting, and important problem in the structure of coatings on aluminum, and have obtained results of both theoretical and practical interest.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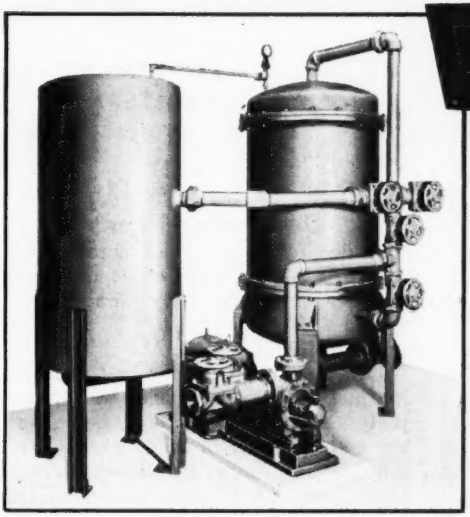

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1 The gallons of solution which can be efficiently filtered in a given period of time.

2 The cost of maintaining the filtering mechanism.

It's an established fact that Wagner Brothers Filters have a higher effective flow rate than any other equipment with *equal filtration area* . . . thus, gallon for gallon, it delivers *more* pure filtrate *per hour* at a lower unit cost. Sludge and other impurities (down to 1/10 micron) injurious to your plating quality are removed when the bath or solution is pumped through permanent membranes caked with a few cents worth of filter-aid (diatomaceous earth).

To clean, you simply turn a few valves and reverse the flow. Air bump backwash shocks the caked filter-aid from the membranes and through the sludge drain. Maintenance costs are reduced to ½ that of ordinary industrial filters since there is no messy replacement of bags, sheets or pads, no manual cleaning labor, no dismantling.

Standard models are available in capacities from 560 GPH up, filter areas from 3 to 100 square feet.

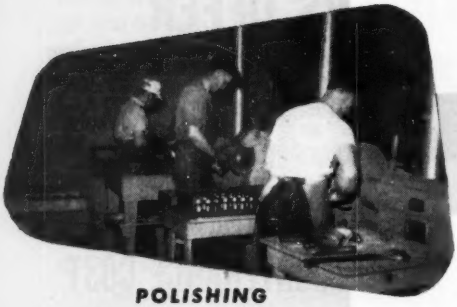
We design and build specials to suit your requirements. Write for detailed information and filtering questionnaire. If you're a plating equipment distributor, ask about territories open.

Your *primary* source for plating and polishing equipment and supplies.

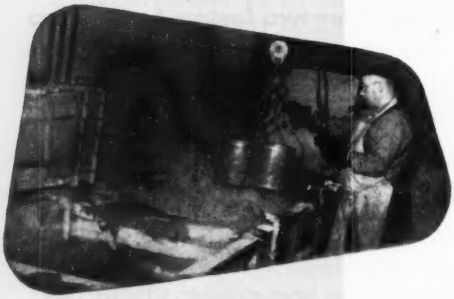
Wagner **BROTHERS INC.**

432 MIDLAND AVE. • DETROIT 3, MICHIGAN

Chicago • Rochester • Cleveland • Cincinnati • St. Louis • Indianapolis • New York



POLISHING



CLEANING

PLATING

FINISHING

New • EQUIPMENT • MATERIALS • PROCESSES

Decorator Press

A decorator press for screen process printing on rigid sheet materials has been announced by General Research & Supply Co., 572 S. Division Ave., Grand Rapids 3, Michigan.

Designed for printing and decorating metal and plastic signs and nameplates, cardboard displays, book covers and a variety of other items on rigid sheets of metal, plastic, cardboard, glass, wallboard, and plywood, the General Decorator Press will handle rigid sheets ranging from 8 by 12 to 19 by 25 inches in size and from 0.010 to 0.625 inch thickness.

The speed range is from 1000 to 2000 sheets per hour. The press can be fed by hand from an automatic stock lift, or by a conveyor system. The printed sheet is then delivered by tapes for the drying operation.

The Decorator Press incorporates many features of the regular General Presses for screen process printing.

"Free" Cyanide Test

Manufacturer: Universal Plating and Novelty Co., Inc., 348 West 36th St., New York 18, N. Y.

A special alloy "Pencil" for determining the approximate free cyanide concentration of high-speed copper plating solutions is immersed in the bath for 15 seconds. If the "Pencil" becomes copper coated, free cyanide is too low. If it become brass colored, free cyanide is in a safe working range. If "Pencil" retains clean appear-

ance, free cyanide is too high.

The "Pencil" can be used for several hundred tests. It is made ready for the test by sharpening in any automatic pencil sharpener.

Multi-Stage Cleaning Machine

The Equipment Division of the Magnus Chemical Company, Inc., 208 South Ave., Garwood, N. J., has announced an automation development for the metal working industry, the Magnus "Aja Lif" fully automatic multi-stage batch cleaning and processing method.

This equipment, invented and pioneered by Magnus under the trade name "Aja Lif Automatic," consist of a series of independent, self-contained dipping units serviced by an automatic conveyor system.

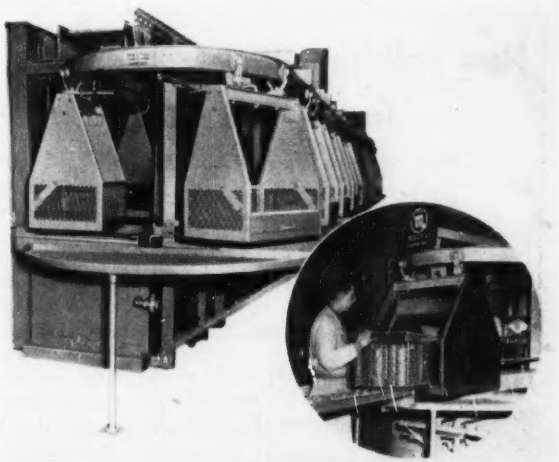
The dipping, raising, and transfer of the parts from one stage to the following stages is fully automatic, and in addition the work to be processed is vigorously agitated up and down in each solution according to a pre-determined exposure time program.

The entire operation is fully automatic. A timing device makes it possible to vary the processing cycle according to technical requirements. The equipment is air powered.

This versatile equipment can be designed for any number of stages, alkaline or acid, and also drying operations. It requires no special foundation and can be installed in any existing production line.

Magnus Aja Lif Automatic Machines are designed for cleaning all types of metal parts ranging from small intricate parts in large batches to large hollow bodies.

Literature available.



View of Magnus "Aja-Lif Automatic" cleaning machine. Inset shows loading of machine from roller conveyor.

Flexible Abrasive Belt Grinder-Polisher

Manufacturer: Hammond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo, Michigan.

The Model F-1 Flexible Abrasive Belt Grinder-Polisher, developed by Hammond, is designed for deburring, grinding, polishing, and finishing of hard-to-get-at areas of metal products.

The polisher, available as a bench or floor model and furnished with a built-in dust collector if desired, is ideally suited for fabricating and finishing departments as well as toolrooms, machine shops, and maintenance departments.

Features of the Model F-1 include the 10½-inch throat depth which makes possible the finishing of large, irregular shapes. The work table and platen ensure accurate grinding of flat surfaces, yet irregular contours can be polished by removing platen and work table.

Bench Model F-1 Flexible Belt Grinder-Polisher

Bulletin 320 available.

Slightly Used BUFFS

Air-Cooled Loose and Sewed

Any Quantity — Any Size

New Polishing Wheels

Grain

Glue

Abrasive Belts

Compounds

Write today for details.

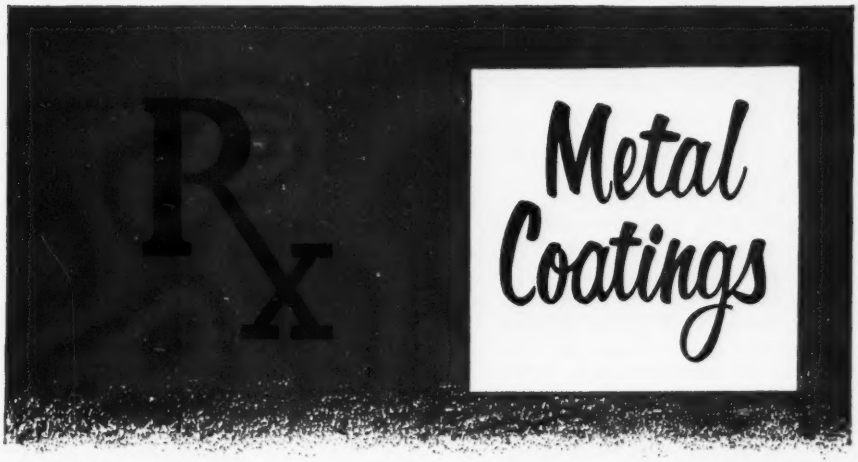
MICHIGAN BUFF CO., INC.

3503 Gaylord Ave., Detroit 12, Mich.

Skid-Proof, Corrosion Resistant Floor Coating

NeoFloor is an economical and easily applied skid-proof surface coating for concrete, wood and metal floors. Developed by the Pennsylvania Salt Manufacturing Company for use in plants, shops and other places where oils, greases and chemicals create safety hazards and maintenance problems, NeoFloor provides safe, comfortable footing and long lasting surfaces which stand up under heavy traffic, heat aging and other rugged conditions.

As described by Robert R. Pierce, sales manager of Pennsalt's Corrosion Engineering Products Department, NeoFloor is a grit-like material anchored in a matrix of resilient neoprene



The experience of Watson-Standard Laboratories serves the metal coatings industry in many fields.

We have developed successful systems of finishes which are currently being used for **crown finishing, can decorating, exterior signs, metal awnings, high heat finishes for heaters, anti-corrosion finishes, high speed coatings** and many others. These are typical accomplishments.

The Watson-Standard Laboratories have formulated coatings for many uses and methods of application. We will assist you with your coating problem.

Watson-Standard CO.

225 GALVESTON AVE., PITTSBURGH 30, PA.

NEW YORK OFFICE: 15 Park Row, New York 38, N. Y. • CHICAGO OFFICE: 55 E. Washington St., Chicago 2, Ill.

INDUSTRIAL FINISHES • PAINTS • PLASTICS • CHEMICALS

and bonded firmly to the floor with an adhesive primer. Both primer and coating are supplied in liquid form for easy, quick-drying application with brush or roller.

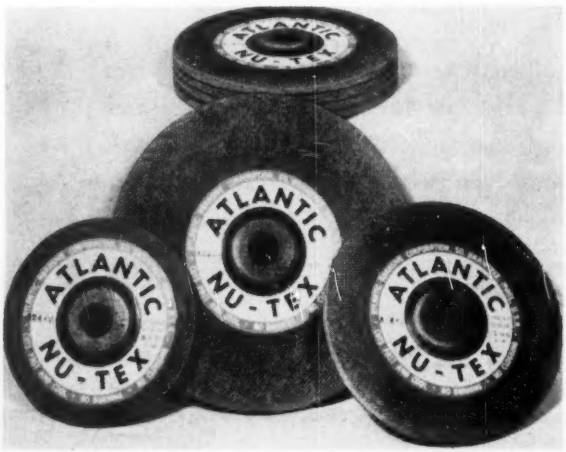
NeoFloor is a tough, tightly bonded material which is highly resistant to fumes, spillage from acids, alkalies, salt solutions and solvents at temperatures up to 220 deg. F. Also waterproof, NeoFloor is impervious to oils and greases and is easily cleaned with commercial detergents and cleaners.

Additional information may be obtained from the Corrosion Engineering Products Dept., Pennsylvania Salt Manufacturing Company, 527 Widener Bldg., Philadelphia 7, Pennsylvania.

Textile-Reinforced Disk Wheels

Atlantic Abrasive Corp., 524 Pearl St., South Braintree 85, Mass., manufacturer of Nu-Tex Mounted Points and Atlantic Grinding Wheels, has announced the addition of Nu-Tex Depressed Center and Straight Disk Wheels to the Atlantic line. Designed for cutting, slotting, weld removal and rough grinding, these textile-reinforced wheels may be used on either portable or bench-type grinders. Their special, built-in resiliency provides a cushioned cutting action which reduces bouncing, holds wheel in close contact with work and distributes pressures evenly over grinding surfaces. A tough resinoid bond with textile reinforcement assures extra protection against breakage and increases wheel life.

Nu - Tex Depressed Center Disk Wheels are available in 7 and 9-inch diameters with thicknesses from 1/8 to 3/8-inch. Nu-Tex Straight Disk Wheels are offered in sizes ranging from 1/16 to 1/2-inch. All Nu-Tex Disk Wheels are available in popular grit sizes. Grades range from 0 (hard) to 6 (soft).



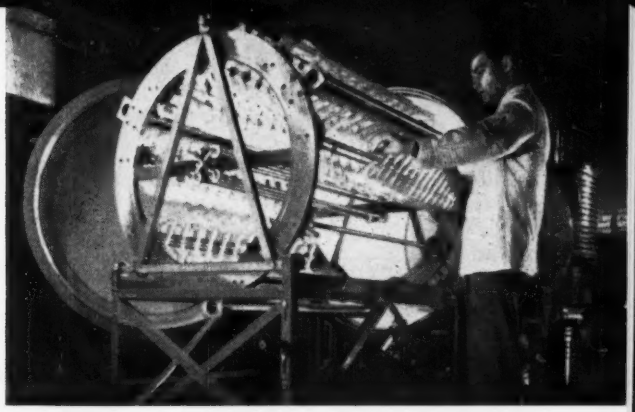
Textile-reinforced Disk wheels

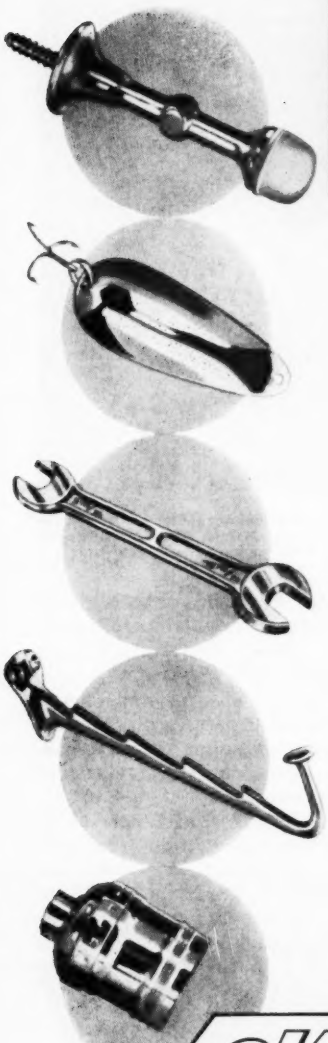
Paint Stripper

Harstan Chemical Corp., 1247 38th Street, Brooklyn, N. Y., has announced the development of a brush-on paint stripper, Harstan No. 468.

The stripper is a non-corrosive, non - flammable, and practically odorless liquid of a jelly-like consistency, designed to strip both baked and air dried enamels and lacquers.

The stripper is applied by brushing or flowing it on to the surface of the part and in





CVC vacuum metallizing will reduce your finishing costs

CVC's vacuum metallizing process produces a durable, sales-compelling finish without hand buffing and polishing in *three low-cost operations*.

First, an undercoat lacquer is applied by either the spray or dip method. Then, a thin film of aluminum is evaporated on hundreds of pieces at a time in a *CVC vacuum* metallizer. Finally, an abrasive-resistant topcoat lacquer is applied. With the proper choice of dye in the topcoat lacquer, a gold finish can be simulated or many unusual metallic colors can be created.

The products illustrated represent a cross section of items *completely* finished with *CVC's vacuum* metallizing for a per unit cost of from 1 to 4 cents.

Send us samples of your product—it will cost you nothing—see first-hand what *CVC vacuum* metallizing gives you in a low-cost, durable, metallic finish. ***Consolidated Vacuum Corporation, Rochester 3, New York***. (A subsidiary of Consolidated Engineering Corporation, Pasadena, California.)

CVC

Consolidated Vacuum Corporation

Rochester 3, N. Y.

formerly DPi Vacuum Equipment Dept.

designers and manufacturers of high vacuum equipment

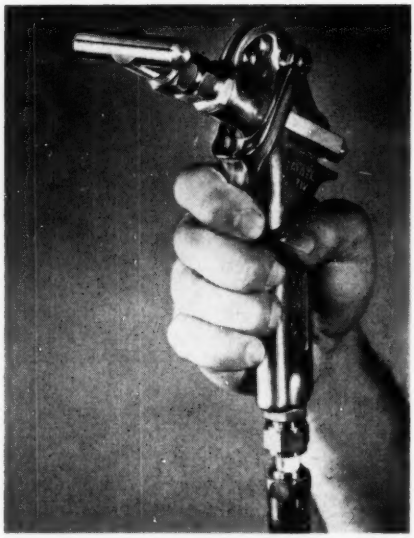
SALES OFFICES: PALO ALTO, CALIF. • CHICAGO, ILL. • CAMDEN, N. J. • NEW YORK, N. Y.

a matter of minutes it lifts the paint from the base metal. The loosened paint is then troweled or flushed away. Harstan No. 468 is formulated so that it stays on a vertical surface without evaporating or running down the sides for as long as necessary.

Flow Gun for Ceramics

Development of a precision flow gun — Model 31V — for use in the ceramic field has been announced by the Binks Manufacturing Company, 3118-40 Carroll Avenue, Chicago 12, Ill. Its design represents two years experimental work by Binks' engineering department in cooperation with the Hotpoint Co. which now uses the new gun in the production of ranges.

The new gun, designed to replace cupping, was developed for use in porcelain enamel finishing. It flows ground coatings on quickly and smoothly. By using stainless steel parts and a special valve of abrasive-resistant material, the problem of rapid wear is avoided. In addition to saving time and material, the 31V gun for ceramics is said to do a better job.



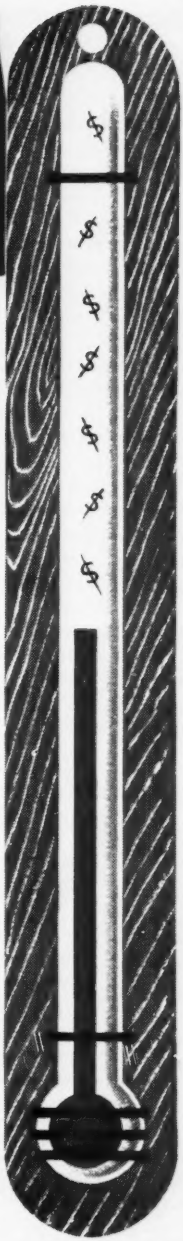
Model 31V Flow Gun designed particularly for use in the ceramic field. Nozzle OB-283 (illustrated) deposits a 2-inch wide flow of material.

For work of this kind a special T-shaped brass nozzle is used. The stem of the "T" attaches to the gun. The cross-bar consists of a hollow cylinder, both ends of which are closed. A lengthwise slot flows a 2-inch strip of material. By careful triggering, the flow can be precisely controlled.

Open Mesh Abrasive

Sand Screen, Carborundum's non-clogging open-mesh abrasive material,

NO HEAT NEEDED



when you use NEW HOUGHTO-CLEAN *"cold" cleaners**

This substantial saving in heating costs alone, by changing to room-temperature Houghto-Clean, is enough to please any plant operator. But this manufacturer is now getting many other benefits besides:

- Easier to mix
- Temporary rust protection
- Parts cool enough to handle
- Longer solution life than hot cleaners
- Improves working conditions by eliminating hot, steamy installations

Write now for new Houghto-Clean bulletin, describing the unique room-temperature cleaning method for use in power washers on production lines. Address E. F. Houghton & Co., 303 W Lehigh Ave., Philadelphia 33, Pa. Or ask the Houghton Man for a copy.

HOUGHTO-CLEAN COLD CLEANER

a product of

E. F. HOUGHTON & CO.

PHILADELPHIA · CHICAGO · DETROIT · SAN FRANCISCO

Ready to give you on-the-job service . . .

* Room-Temperature Metal Cleaning Saves Screw Manufacturer $2200 a year!

designed especially for sanding operations where loading or glazing is a problem, is now commercially available in a variety of shapes and sizes from Carborundum Co., Dept. PF 82-46, Niagara Falls, N. Y.

Extensively field tested in the sanding of ferrous and nonferrous metals, wood and paint undercoats and sealers, Sand Screen has been found to give longer life than coated abrasives.

The sanding, screen-like abrasive is coated uniformly on both sides, with silicon carbide grain. Its unique, open-mesh construction reduces loading to a minimum, by permitting sanding residue to flow freely through the numerous openings, and also enables the material to be used on both sides. Through a recent development in the manufacturing process, it is now possible to retain the sharpness of the abrasive grain on both sides.

Sand Screen can be used wet or dry, for both machine and hand sanding operations. It comes in full sheets, cut sheets and discs, in grit sizes of 180 and finer, and in standard 50-yard rolls up to 18 inches wide.

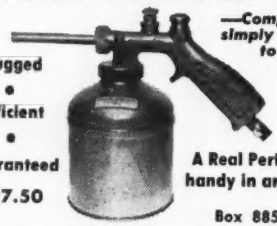
Sand Screen Abrasive Disc

The new material can be used flat or can be folded to any desired size for hand sanding. It can also be creased and torn readily into any desired width from a 9 by 11 inch sheet.

In machine sanding, excellent results are being obtained with Carborundum's Fastcut and Flexbac pads. An application now under test and showing promise involves the use of builtup wheels, made from Sand Screen discs, for light deburring and other polishing operations.

Portable Sandblast Gun

—Complete— simply connect to air line



Rugged • Efficient • Guaranteed

$27.50

A Real Performer handy in any shop

LINDBERG PRODUCTS CO., Box 885 P Los Gatos, Calif.

Corobond Resin Cement

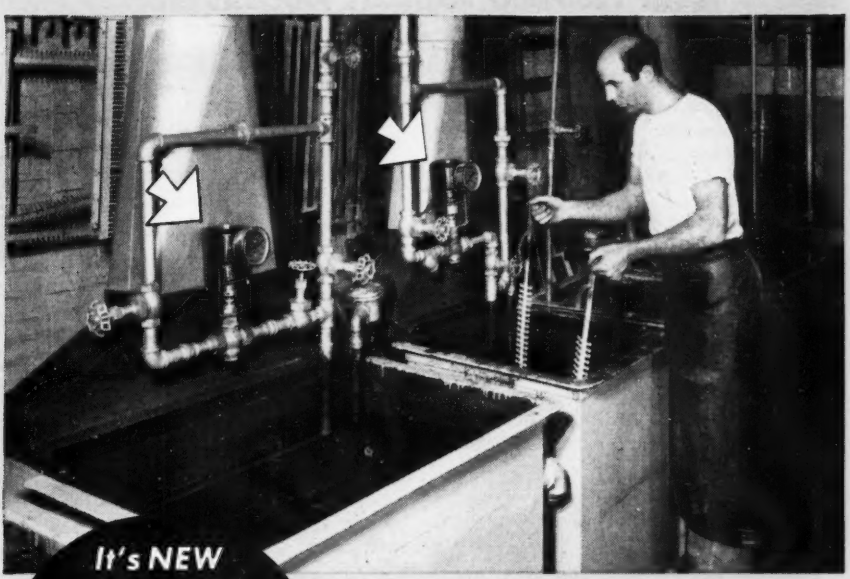
The Ceilcote Company, 4848 Ridge Road, Cleveland 9, Ohio, has an-

DON'T BE FOOLED BY FALSE CLAIMS

ROBERTS ROUGE COMPANY
STRATFORD, CONN.
Originators of Micro-Lustre Finishers

★ Fine buffing compounds are a combination of the best of materials and years of manufacturing experience.

Since 1881 A LONG TIME TO CONTINUE SUCCESSFULLY



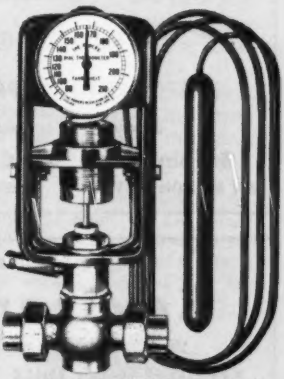
It's NEW

POWERS

Temperature Regulator
for Plating • Pickling
Bonderizing
Chromate Dips
Cleaning • Rinsing

Saves LABOR and Steam
Helps Eliminate Costly Rejects

POWERS No. 11-MF Regulator insures most effective use from various solutions by holding them at the right temperature automatically.



Plastic Thermal Bulb and Tubing is highly resistant to solutions used in above processes. Prevents electrical shorts. No insulators required for the regulator.

Easy to Read 4" Dial Thermometer indicates temperature of liquid being controlled and makes it easy to adjust regulator for different temperatures.

Bulletin 330 fully describes this simple, self-operating regulator. (b50)

THE POWERS REGULATOR CO., SKOKIE, ILL.

Offices in over 50 Cities, see your Phone Book • Established in 1891

nounced the availability of Corobond, an improved synthetic resinous bonding cement for brick and tile. The material resists the corrosive effects of acids, alkalies and solvents. Chief advantage of Corobond resin cement is its superior workability and longer pot life which provides a greater working time prior to initial set, regardless of temperature. A mixture of acid hardeners, acting on a delayed reaction principle, slows the initial hardening of Corobond and allows ample working time when large batches are mixed. Corobond hardens with minimum shrinkage to an extremely dense material which provides high mechanical and tensile strength.

Optimum workability of Corobond is obtained when mixed to manufacturer's recommendations. The mixture seldom requires additional liquid or powder because of compensating ingredients which reduce excess liquid absorption. With every batch, masons or plant maintenance men are assured a perfect mix that fills joints easily and completely without running from between bricks.

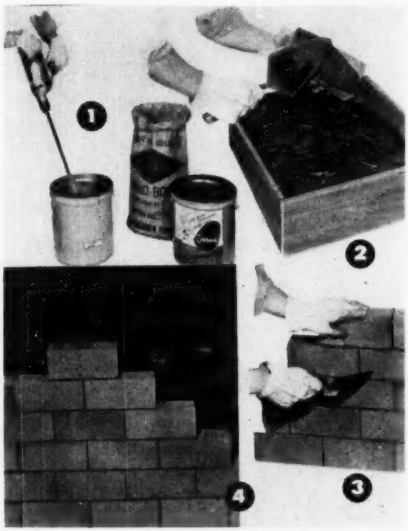


Illustration shows steps required in using Corobond

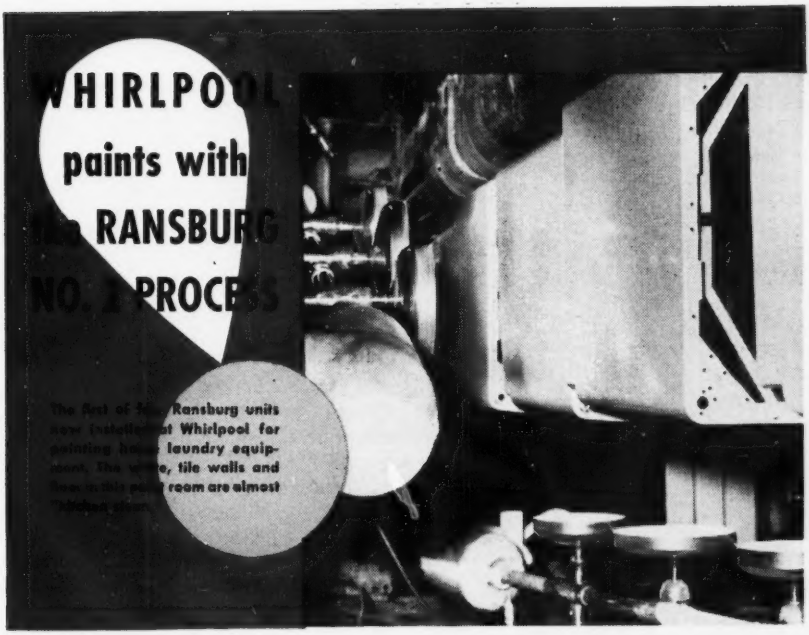
The ability of Corobond resin cement to withstand acids, alkalies, solvents, hot water and live steam makes it ideal for the construction of acid pickling and neutralizing tanks, plating room floors, and other installations requiring acid or alkali resistance.

Silicon Carbide Rubber Cushioned Abrasives

A series of rubber-cushioned abrasives compounded with silicon carbide has been announced by the Brightboy Industrial Division, Weldon Roberts

McKeon's "Liquid Sulphur"
Most economical, most satisfactory method of
STRIPPING COPPER.
Brochure on request.
Sulphur Products Co., Inc.
228 McKEON WAY GREENSBURG 6, PA.

For a real good polishing job use
Keystone TURKISH Emery
FRESH SUPPLY AVAILABLE
KEYSTONE EMERY MILLS Write for Sample 4316 Paul St., Phila., Pa.



● When Whirlpool Corporation switched from hand spray to the Ransburg No. 2 Process, paint mileage jumped approximately from 8 washer cabinets to TWENTY-TWO cabinets per gallon of paint. Whirlpool, too, was the first to employ the Ransburg "grouping" conveyor, especially suitable for use on washer or refrigerator lines.

Along with this spectacular paint saving, Whirlpool reports a more uniform, higher quality finish on their home laundry products. The number of repaint jobs was cut from 40% to less than 10%, and less than 1% of these were due to defective paint application.

Other economies are being achieved. The former 60-ft. water-washed, downdraft, hand spray booth was taken out, cutting maintenance, make-up air, and heat loss substantially. Since there is no overspray paint to be exhausted with the No. 2 Process, ventilation is needed only for solvent vapor, and make-up air was reduced accordingly.

Appreciating the many advantages achieved on this cabinet line, Whirlpool put three more No. 2 Process Units to work, one on their dryer line . . . one on a miscellaneous parts line . . . and one on their wringer washer line in the Clyde, Ohio, plant.

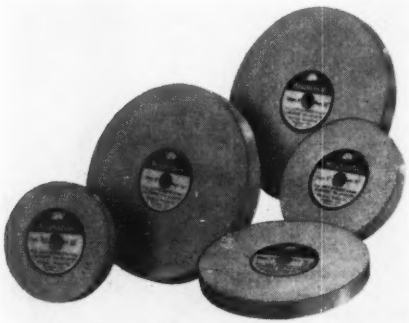
The Whirlpool story is another typical example of greater efficiency, increased production—at less cost—with the Ransburg No. 2 Electrostatic Spray Process.

Write for our brochure describing the No. 2 Process in detail. Or, ask for our sound and color movie which shows numerous on-the-job examples of the No. 2 Process at work in plants all over the country.

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana

RANSBURG

Rubber Company, Sixth Avenue and North 13th Street, Newark 7, N. J., pioneer in the rubber-cushioned abrasive field.



Silicon Carbide Rubber Cushioned Abrasives

Brightboy abrasives will continue to be manufactured in compound with aluminum oxide, since the demand for this type of abrasive cushioned in rubber has shown a substantial increase.

Both the aluminum oxide and silicon carbide types of Brightboy are now being manufactured in an extensive variety of abrasive grain sizes ranging from extra coarse to extra fine. Brightboy, compounded either with silicon carbide or aluminum oxide is made in wheels, discs, sticks, rods, cylinders, tablets and blocks for a wide range of machine and manual operations.

Brightboy items in either aluminum oxide or silicon carbide feature rubber binders carefully compounded with abrasive grain, to achieve a resilient rubber cushion for the evenly blended abrasive. Both the aluminum oxide and the silicon carbide lines are particularly successful in removing heavy tool marks from forged aluminum, smoothing weld marks, polishing and burring stainless steel, and in many operations on both hard and soft metals. Brightboy products frequently speed production by performing four operations at once: burring, cleaning, finishing and polishing.

Brightboy works on all metals and will do many jobs on plastics and laminated materials. The Brightboy Service Department will be glad to assist you with your finishing problems.

Pickling Fume Depressant

Cowles Chemical Company, 7016 Euclid Ave., Cleveland 3, Ohio, has announced the addition of AA Compound to its Metal Cleaner line.

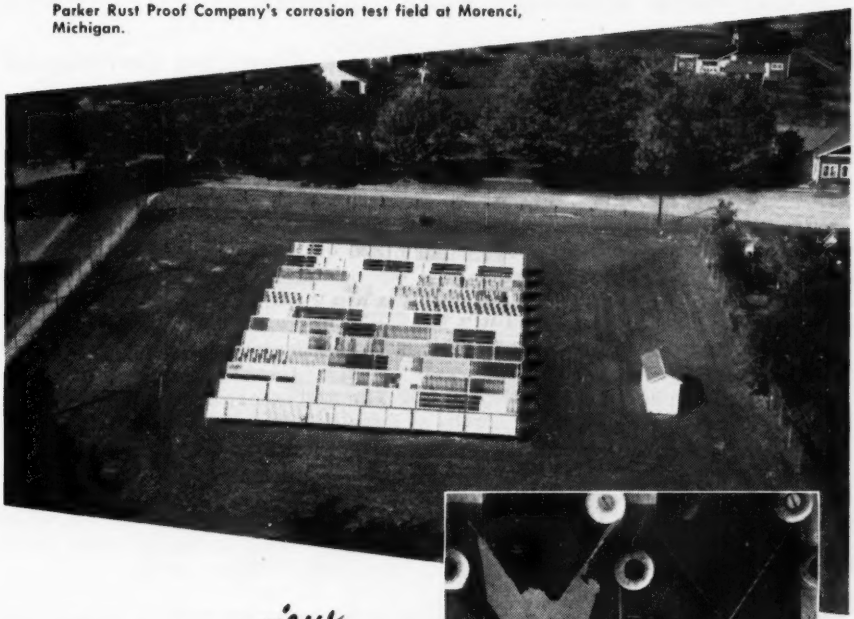
Designed to reduce the hazards and discomforts of pickle rooms, AA Compound produces a foam blanket on the surface of the acid bath, smothering the fuming, fogging and spraying action which is very damaging to men and equipment. A white, granular power, AA Compound is dust-free and slightly acid. Added directly to the pickle bath in quantities as small as three oz./100 gal.. of acid solution, AA Compound produces a blanket of foam which is stable and long-lasting.

Acid action is not reduced in any way, and faster pickling operations are possible because the foam blanket keeps the heat in the tank, eliminating the loss of heat through fuming. The Compound rinses freely and completely and keeps the acid bath clean by precipitating loosened dirt.

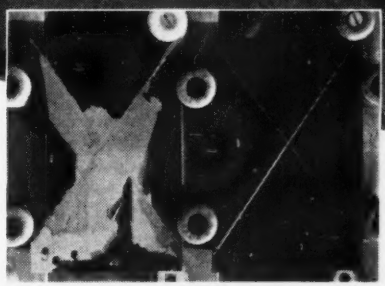
Paint Spray Guns

A completely redesigned series of four paint spray guns has been announced by Sharpe Manufacturing Company, Los Angeles. Described as high performance, versatile and rugged, the new Sharpe guns incorporate precision gun heads with new super comfort grip handles.

Parker Rust Proof Company's corrosion test field at Morenci, Michigan.



Birds-eye view of a strange crop



What weather does to finishes! Panel left, paint over untreated aluminum. Panel right, paint over Bonderite-treated aluminum. 11 months outdoor exposure.

A crop of 6,400 metal panels is tended in Parker Rust Proof's outdoor test field. The harvest is facts on the durability of various finishes over various metals.

Conditions here are the same as are met by painted products in daily outdoor use. The sun and the wind, the rain, sleet and snow pound at these panels continually. Parker technicians watch each set of panels individually, observe their condition, chart results at regular intervals.

This large-scale outdoor testing program, continuous since 1935, has helped build Parker's great fund of valuable information on how to control corrosion. The facts we learn from the corrosion test field are passed on to guide our customers to more effective, more economical surface treatments for metals.

*Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

Since 1915—leader in the field

PARKER RUST PROOF COMPANY

2178 E. Milwaukee Ave., Detroit 11, Michigan

BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE
corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces

Model 35 Paint Spray Gun

Of special importance in low cost parts replacement is the standardization of tips and nozzles. A full range of air nozzles — internal or external — interchange on all fluid tips within the line.

A choice of two designs is offered. The first is an integral headstem assembly that connects with cup container for paint. The second substitutes a threaded fluid intake fitting for either a cup or for a material line.

The models 20, 25, 30 and 35 comprise the new Sharpe line. All feature few parts with resultant ease of cleaning and service.

Catalog sheets available.

Steam Cleaning Compound

Oakite Products, Inc., manufacturer of industrial cleaning and allied materials, has announced the development of a cleaning material, Oakite Composition No. 93, specifically designed for use in steam-generating equipment and in steam guns where the solution is siphoned from an auxiliary tank. The material, the manufacturer reports, meets Federal Specification — Steam Cleaner (tentative) — P-S-00751 (G.S.A.-F.S.S.)

Oakite Composition No. 93 is a white, free-flowing powdered material which is readily and completely soluble in water in a broad range of concentrations and use. It possesses exceptionally high sequestering ability and, when added to water up to 20 grains hardness, will show no precipitate or turbidity. Normal working concentrations

use
Electro-Glo
ELECTRO-POLISHING CONCENTRATES
SAVE TIME . . . SAVE LABOR . . . INCREASE PRODUCTION
SMOOTHS . . . BRIGHTENS . . . DEBURRS
Removal of metal can be controlled down to .0002 of an inch.

COPPER ALLOYS	ELECTRO-GLO #200
AUSTENITIC STAINLESS STEEL	ELECTRO-GLO #300
MARTENSITIC STAINLESS STEEL	ELECTRO-GLO #400
CARBON STEEL	FERRO-GLO #500

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Electro-Glo COMPANY • 1432 SO. TALMAN AVE. • CHICAGO 8, ILL.
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WAGNER BROTHERS, INC.
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These famous

CHROMALOX ELECTRIC HEATERS

solve hundreds of heating problems

efficient, dependable electric heat

Easy to Install CHROMALOX Electric Heaters give clean, dependable, accurately controlled heat where and when heat is needed. They produce uniform and accurate temperatures by automatic or manual control. Low initial costs, low installation costs and low operating costs are among the advantages of using CHROMALOX Electric Heaters in tanks, ovens, air ducts, kettles and other applications requiring economical and efficient heat.

Discuss your baking, degreasing, curing, and other heating requirements with a CHROMALOX Application Engineer. Let him show you how CHROMALOX Electric Units can help do your heating jobs more efficiently at less cost.

for drying, degreasing, baking, etc.

WANT MORE FACTS?

Request the useful booklet "101 Ways To Apply Electric Heat." It contains photographs and drawings showing Chromalox Electric Heaters at work in plants throughout the United States. Write today for your copy. 1C-54

CHROMALOX

ELECTRIC HEAT FOR MODERN INDUSTRY

EDWIN L. WIEGAND COMPANY

7552 Thomas Boulevard, Pittsburgh 8, Pa.

range between ¼ and 4 oz./gal. of water, into which the material is sprinkled and stirred until dissolved. Solutions of Oakite Composition No. 93 are nontoxic, safe, and pleasant for steam gun operators to use, since no offensive odors are evolved.

Additional information about this steam-cleaning material can be obtained from Oakite Products, Inc., 120 Rector Street, New York 6, N. Y.

PRODUCT LITERATURE

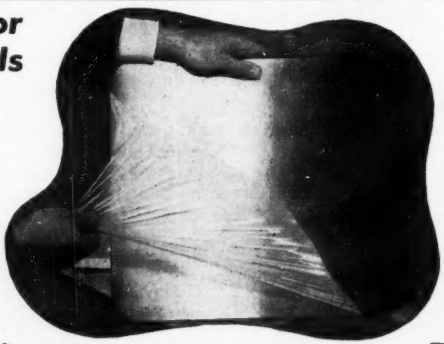
PRODUCTION HANDLING EQUIPMENT. Wilder Mfg. Co., Inc., Mechanic St. & Erie R. R., Port Jervis, N. Y., is distributing a catalog listing specifications of various sizes and types of trucks useful in finishing shops. The steel trucks are of various kinds, as required for movement of material, for baking, cleaning, and other operations. All are mounted on swivel casters for easy movement.

BARREL FINISHING BROCHURE. The Abbott Method of barrel finishing and an improved tumbling barrel are fully described in a new four-color brochure recently issued by **The Abbott Ball Company,** 1084 New Britain Ave., Hartford 10, Conn. Intended to familiarize tumbling barrel users with a method of barrel finishing which employs the use of steel balls and shapes, the brochure also describes, in detail, the newly revised Abbott Vertical Barrel with base-mounted motor, gear reduction drive and Color Dynamics finish.

Because it covers all the essential points of deburring and burnishing stampings, castings and other metal parts with steel balls and shapes, the literature also gives useful information pertaining to these materials. Some barrel finishing materials discussed are deep hardened and tempered for burnishing.

A Strippable Plastic for the Protection of Metals

Striplastic is a protective plastic applied by spraying, dipping or rolling. It is used on stainless steels, high polished metal sheets, sheets in cold working or drawing, tools, dies and parts, and on sheets or metal parts before packaging. It protects against scratching and abrasion, and against rust. Also available as a booth coat protection.



THE STRIPLASTIC COMPANY
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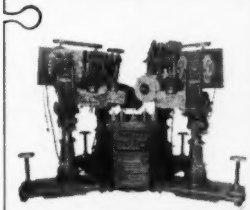
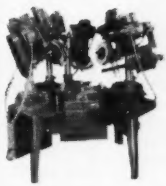
Among many advantages, it is nontoxic, possesses great tensile strength and is easily stripped off in one piece. Write for complete information on this new strippable plastic.

Amazing Versatility of Packer-Matics

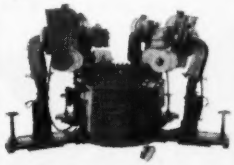
TURNS "SPECIALS" INTO ROUTINE JOBS!



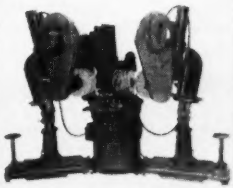
No. 4-5 ROTARY INDEXING



No. 9-4 ROTARY INDEXING

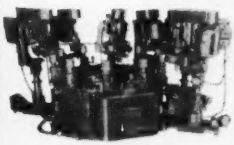


No. 14-45 CONTINUOUS ROTARY



No. 4-24 CONTINUOUS ROTARY

No. 1 STRAIGHT LINE CONVEYOR



No. 13-10 ROTARY INDEXING

they'll "polish off" your finishing costs

Cost-wise production men recognize and demand the flexibility, speed, and efficiency of these Packer-Matic completely automatic polishing and buffing machines. Whatever your finishing requirements — buffing, polishing or deburring, regardless of shape, size or metal — Packer-Matics can do it faster, economically and with greater uniformity than hand operation.

Packer-Matics are especially designed to meet your specific requirements. Production rates are boosted — buffing costs slashed while *superior finishes are constantly maintained — each piece finished exactly alike.* Packer-Matic engineers are always ready to show you how improved finishing techniques can speed up production, increase your profits, reduce overhead. *Write us today.*

PACKER-MATIC

AUTOMATIC MACHINES FOR BUFFING • POLISHING • DEBURRING

THE PACKER MACHINE COMPANY • MERIDEN, CONN.

Others, used in conjunction with certain abrasives, are called "soft" metal shapes and contribute definite actions to cutting down and deburring operations.

PROTECTIVE COATING BULLETIN. Not all products of iron, steel or aluminum require the maximum in protection against corrosion and abrasion, but for those that do, Industrial Metal Protectives, Inc., offers Zincilate No. 100.

One of several protective coating formulations produced by this Dayton, Ohio concern, Zincilate No. 100 is described fully in an illustrated bulletin just released. Information on the proper use of Zincilate No. 100, including surface preparation for spray, dip, flow-coat or brush applications, is included.

Copies of the bulletin are available from **Industrial Metal Protectives, Inc.**, 401 Homestead Avenue, Dayton 8, Ohio.

FILTERS FOR PLATING SOLUTIONS. An illustrated bulletin describing horizontal plate filters for electroplating solutions is available from **Sparkler Manufacturing Co.**, Mundelein, Ill.

BULLETIN NO. 760 lists specifications on standard sizes of rubber-lined units and iron or stainless steel filters. Design features of filter models for acid solutions such as bright nickel, acid copper and zinc and nickel dip solutions are illustrated and described. Filters for copper, zinc, and cadmium cyanide plating solutions, and cleaners are listed and their features outlined. Specific filter construction for acid copper, pickling solutions, and dull nickel solutions, as well as a number of other plating solutions in this general category, is described in the informative bulletin.

PLATING BARREL BULLETIN. An illustrated bulletin listing the many types and models of ribless plating barrels supplied by the company is available from **Hardwood Line Mfg. Co.**, 2022 N. California Ave., Chicago 47, Illinois. Operating details of the plating barrels are described and a number of different applications are suggested. Tanks designed for heating with gas or steam are shown, as well as single and multiple barrel plating units.

Specifications for the various models are included in the illustrated bulletin.

Better Uniformity..Greater Efficiency
in GEHNRICH Standard Recirculating OVENS
ELECTRIC · GAS · OIL · STEAM

for Baking Organic Finishes
Drying after Washing
Low Temperature Heating

Coordinated heating and air recirculation system assures safe uniform heating conditions to 500°, at minimum operating cost.

Available in truck or rack loading types — 18 sizes, as well as in bench and cabinet types — 3 sizes.

Special ovens—batch or continuous types—built to requirements.

ROCKWELL SINCE 1888 BUILT

W. S. ROCKWELL COMPANY
FURNACES • OVENS • BURNERS • VALVES • SPECIAL MACHINERY
2904 ELIOT STREET • FAIRFIELD, CONN.
Sales Representatives in Principal Cities

the finest stripper of all

is in a NORTHWEST drum

"Step right up Gentlemen, you ain't seen nuttin' yet." And you haven't until you've seen Northwest's New Liquid Stripper # 6 in action. This high-speed baby really "peels" all organic finishes from steel, magnesium, and zinc die castings in one performance—no two, three, or four run-throughs before the work is ready for re-painting. The closest approach to a universal stripper yet developed.

Liquid Stripper # 6 is Safe—no fire hazard, no odor, no fumes, non-toxic • Liquid Stripper # 6 is Sure—parts are fully cleaned—metal surface is unharmed—long life is assured—economy is proven • Liquid Stripper # 6 is Soluble—converts paint film to soluble form which can be rinsed off with a water spray—contains no chemicals which cannot be flushed through sewers.

Call your Northwest Cleaning Specialist about # 6 and the other great Northwest Liquid Strippers for aluminum, silicones, and cold stripping.

Remember—YOUR COST PER FINISHED ARTICLE IS THE TRUE COST OF YOUR CLEANER

NORTHWEST CHEMICAL CO.

9310 ROSELAWN DETROIT 4, MICH.

pioneers in pH cleaning control serving you since '32

PORTABLE POWER TOOLS. **Syntron Company,** 452 Lexington Avenue, Homer City, Pa. has released **CATALOG NO. 537,** illustrating and describing its complete line of Portable Power Tools.

It includes descriptive information and specifications on Syntron Electromagnetic Hammers and Hammer Drills, the complete line of Portable Electric Drills, Screwdrivers, Nut Runners, Polishers, Sanders, and Grinders. Information is also included on the new Electric Impact Wrench.

FAN ENGINEERING DATA BOOK. A wealth of ventilation engineering information is included in **BULLETIN A-108,** "Fan Engineering Data," issued by the **Hartzell Propeller Fan Company,** Piqua, Ohio, manufacturer of industrial air-moving equipment.

Among the material selected by Hartzell engineers for inclusion in this 16-page brochure are fans laws and formulas, terms and definitions, recommended velocities for exhaust hoods, an air pressure conversion table, and charts covering duct resistance, entrance losses and rectangular equivalents of round ducts.

Other sections discuss fan installation, maintenance and lubrication, explain noise problems, and show the characteristics of various propeller and wheel designs.

SURFACE TREATMENT OF METALS WITH PEROXYGEN COMPOUNDS, SECOND PART. New and improved methods of treating metal surfaces with peroxygen compounds are described in **BULLETIN No. 51** published by the **Buffalo Electro-Chemical Company, Inc.,** Station B, Buffalo 7, New York. The new publication is based on additional research and development that has occurred since Becco's **BULLETIN No. 39** on the same subject appeared last year.

The types of surface treatments discussed include bright dips, cleaning solutions, passivation and inhibitors. Metals involved in the tests and investigations reported are: steel, aluminum, brass, silver and stainless steel.

The peroxygen compounds used in these new developments in metal surface treatment are hydrogen peroxide, compounds forming hydrogen peroxide in solution, persulfates and peracids. Details on their use, including numerous solution formulas, are given, and examples are cited.

CALROD* HEATING CATALOG. A 1954 edition of the catalog on Calrod electric heaters and heating devices is available from the **General Electric Company,** Schenectady 5, N. Y.

Designated as **GEC-1005E,** the 60-page, two-color catalog describes the units in terms of application, special features, installation, and pricing.

More than 175 photographs and drawings illustrate the various products, including immersion, strip, cartridge, tubular, insertion and fin heaters, melting pots, thermostats, switches, and oven heaters.

Indexed by processes and application, the catalog also contains methods for determining power requirements and heat losses for many applications. Another feature of the publication is an index of industrial heating application bulletins, and data and specification sheets available.

---

* Registered Trade Mark of the General Electric Company.

CORROSION-PROOF LININGS CEMENTS BRICK

• TANKS, FLOORS, FUME DUCTS AND PROCESS EQUIPMENT
• COMPLETE LINE OF PROTECTIVE COATINGS . .

Over a Quarter Century of Experience

CEILCOTE CORROSION-PROOF MATERIALS · CONSTRUCTION · SUPERVISION

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SOLVENTS and THINNERS RECOVERED

from wash thinners, spoiled lacquers, degreasing machine sludge, etc.

Solvents recovered by the Lofgren Process.

Each customer's shipment, whether one drum or a carload, receives proper and separate treatment. *Write to:*

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Hammond Solvents Recovery Service
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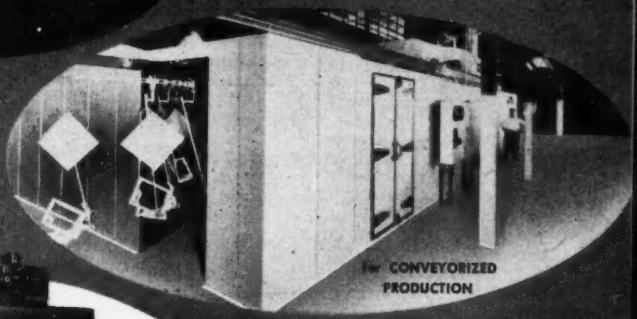
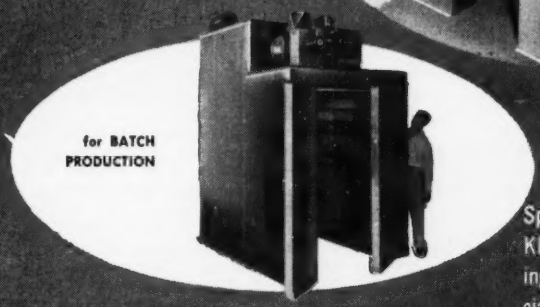
KIRK AND BLUM
INDUSTRIAL OVENS



for CONVEYORIZED PRODUCTION



for BATCH PRODUCTION

Specially designed to solve your problem . . . KIRK & BLUM Ovens meet all needs for drying, baking, dehydrating or other more specialized requirements.

Often Kirk & Blum Ovens up to freight car size are shipped completely assembled, tested and ready to operate. Then, they can be connected and in use in a few hours, saving time and expense. Illustrated are typical installations which show the wide range of KIRK & BLUM experience over more than 47 years.

If you have an oven application, discuss it with a KIRK & BLUM Engineer. There's no obligation. Write for free literature.

for TESTING or LABORATORY

THE KIRK & BLUM MFG. CO.,
3116 Forrer St., Cincinnati 9, Ohio

KIRK AND BLUM
INDUSTRIAL OVENS

For more complete information on products and processes → use READER SERVICE CARDS inside covers.

WOOL FELT CATALOG. American Felt Company, Glenville, Conn., has issued a new catalog of the **COMMERCIAL STANDARD 185-53 WOOL FELT.**

The catalog contains 47 reference samples divided into three classifications. Sixteen different types of mechanical roll felts, 18 types of sheet felts, and 13 types of roll felts for the apparel and decorative trades, are shown.

The catalog has been prepared in complete conformity with a United States Government bulletin, "Commercial Standard 185-52 Wool Felt—A recorded Voluntary Standard Of The Trade," prepared by the United States Department of Commerce in cooperation with the National Bureau of Standards.

GAS-FIRED TANK HEATERS. BULLETIN F-1, being distributed by **Eclipse Fuel Engineering Co.,** Rockford, Ill., lists specifications for, and describes the construction features and applications of gas-fired tank heaters for a number of industrial applications. Included are details and data on gas-fired tank and coil units, "Externo" gas-fired tank heaters, "Imerso" tank heaters. Operation of the gas burners is described, and details of tank construction are included.

MASKING TAPE
DIE-CUT TO YOUR EXACT SPECIFICATIONS FROM
SCOTCH BRAND
INDIVIDUAL PIECES • ANY SIZE OR SHAPE
For quick, accurate masking operations.
PHONE OR WRITE PANOCO
166 HENRY STREET, STAMFORD, CONN.

KEM LUSTRAL ENAMEL. BROCHURE KL-511, available from **Sherwin-Williams Co.,** 101 Prospect Ave., N. W., Cleveland 1, Ohio, an eight-page, two color booklet, explains the requirements met by Kem Lustral, lists advantages and features of the product, and explains the Customix service. Pictured and described are some of the various tests every batch of Kem Lustral must pass in order to meet Sherwin-Williams' system of quality control. Application data and a chart of standard base colors are included.

HILL ACME TOOLS FOR INDUSTRY. Available from **The Hill Acme Company,** 1201 W. 65th St., Cleveland 2, Ohio, is an illustrated folder outlining the products manufactured by the various divisions of the company.

Included is an illustrated description of the "Hill" Abrasive Belt Grinding and Polishing Machine. This machine is supplied in the Pinch Roll Type, for prefinishing of sheets or blanked out shapes in flat form, both in individual units, or for progressive belt operations in continuous line polishing. The machine is also available in the Hydraulic Table Type, or the Strip Type, for processing continuous lengths in coiled form.

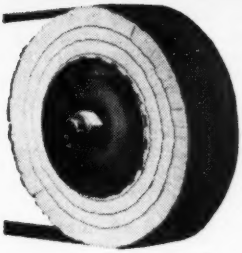
FINISHING SYSTEMS. An illustrated bulletin describing briefly the many products of **Granco, Inc.,** 317 Thirty-Second St., S. W., Grand Rapids 8, Mich., supplied to the finishing industry is available from the company.

These products include complete finishing systems, flameless gas burners, ovens, oven air heaters, flow coat systems, air supply systems, parts washers, metal surface treatment systems, dust collecting and air handling systems, spray booths, and others.

Design features, uses, and advantages of each of the several products are described in the bulletin.

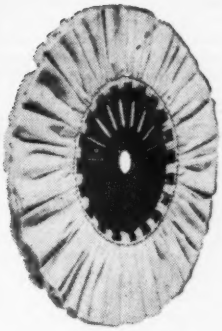
ACID RESISTING MASTIC AND ACID PROOF BRICK
FLOORING AND LINING CONSTRUCTION GIVES
COMPLETE PROTECTION AGAINST ACIDS AND ALKALIES
RALPH V. RULON, INC., 3900 No. 2nd St., Philadelphia 40, Pa.
Acidproof Construction Contractors for Over 50 Years

A FEW OF THE MANY FORMAX PRODUCTS



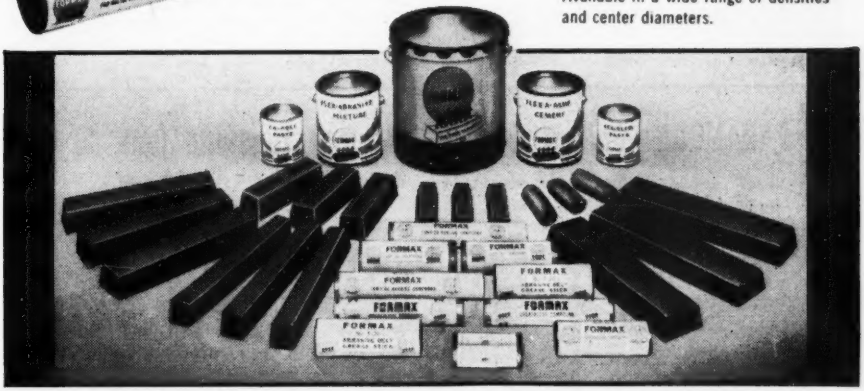
STYLE C-20 CONTACT WHEELS
and F-26 Belt Lubricant

A C-20 flexible Contact Wheel will form itself to the shape of the work and permit the abrasive felt to polish contoured surfaces and F-26 Abrasive Belt Lubricant will increase belt life by preventing loading and glazing. Produces finer, smoother and brighter surfaces through lubrication.



ZIPPO BUFFS

These famous long-wearing buffs run cool under all buffing conditions. Constructed of high count bias-cut cloth or sisal mounted on safe steel centers. Available in a wide range of densities and center diameters.



A complete line of buffing compounds in bar form as well as in liquid form for brush or spray application. Also Flex-A-Glu polishing wheel cements.

Our Laboratory and Sales Engineering staff would welcome the opportunity to be of help in solving your finishing problems.

Send for descriptive literature

FORMAX MFG. CORP.
DETROIT 7, MICHIGAN
"THE FOUR McALEERS"

MANUFACTURED IN CANADA BY JOHN GALLOWAY LTD., KITCHENER, ONT.

PNEUMATIC THERMOMETER CONTROLLER. Pneumatic thermometer controller is described and illustrated in **Bulletin 6401**, available from **Minneapolis-Honeywell Regulator Company**, Industrial Division, Wayne and Windrim Avenues, Philadelphia 44, Pa. Also shown are many of the applications and features of this automatic control instrument for controlling temperatures ranging from -40 to 1,000 deg. F.

CLEANER AND BUFFING COMPOUND DATA. The Apley N. Austin Co., Dept. PF, Pequabuck, Conn., manufacturer of buffing compounds and alkali cleaners has published data on polishing, buffing and coloring compounds, both of the water dispersable and the unsaponifiable type. The data given include the code, description and use of the bars as described from the point of view of the compound. There is also a cross reference which gives the same data from the point of view of the metal or alloy to be treated.

Alkali cleaners are also discussed in detail.

An important addition to the Solubar type buffing compound, which is water dispersable, is Solubar rouge, which aids materially the cleaning problem always prevalent when red rouge compounds are used. Data on these interesting compounds are also included.

INSTRUMENTS FOR MODERN MEASUREMENTS is the title of a new 34-page book published in two colors by **Brush Electronics Co.** It illustrates and describes over 37 different instruments, especially engineered and produced for: electrical measurements, physical measurements, resistance-welding measurements, textile measurements, ultrasonic energy applications, electro-acoustical measurements, etc. Several new instruments are included as well as improved models.

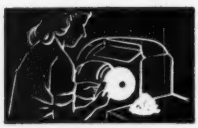
Of special interest to research engineers, methods and production engineers, factory superintendents and other production and research executives, the book will be sent free of charge. Send request on company letterhead to Sales Promotion Dept., Brush Electronics Co., 3405 Perkins Ave., Cleveland 14, Ohio.

Only PARAMOUNT Felt Wheels do so many finishing jobs so well

Just 1 PARAMOUNT Wheel does all three:

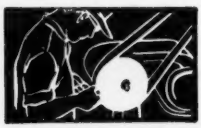
BUFFING

Choose a Paramount Felt Wheel for your highlight buffing and enjoy finishes produced to **your** specifications . . . and get longer trouble-free service from your wheel too! Or use the **same** wheel for —



POLISHING

Set up your wheel with abrasive grains (120-320 grit) for streakless polishing or with greaseless compounds for satin finishes. Or use your wheel as a —



CONTACT WHEEL

Whether you're using belts for polishing or finishing, the wide range of sizes and densities of Paramount Felt Wheels make them ideal for your most exacting work.

Learn what the versatility of Paramount Brand Wheels can mean to your work and your finishing costs. Call your Supply House today for details.

New Catalog Answers your questions about felt wheels

Just off the press — a new 12-page catalog crammed with authoritative finishing information. Send for your free copy today.

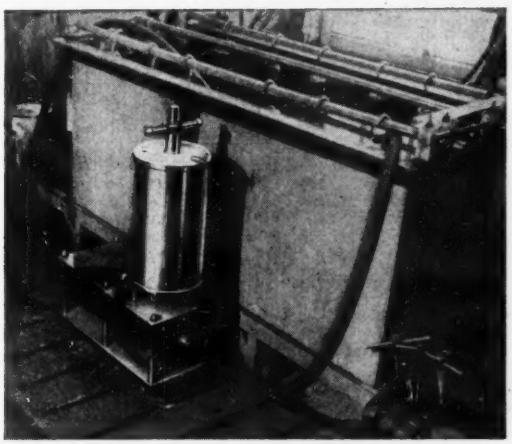
Boacon Felt Company

407 WEST WATER STREET • TAUNTON • MASSACHUSETTS

Established 1825 "Felt Does It Better"

Here's how to cut your losses

get better finished plated work — save time and labor



The *"Sealed-Disc"* Filter will remove all dirt, dust, and sludge from your plating solutions. You will no longer worry about pitting, spotting, poor adhesion, formation of nodules, etc.

More and more platers testify to the remarkable savings in operating time and labor that the *"Sealed-Disc"* Filter gives them. These cost-minded platers get better finished plated work and have found that their solutions last l o n g e r. *"Sealed-Disc"* Filters, designed to meet plating room requirements, are smaller, more compact and portable, than ordinary conventional filters.

Regardless of the size or type of your installation, there's a *"Sealed-Disc"* Filter to "fit your job". You can depend on a *"Sealed-Disc"* Filter for positive, trouble-free performance that's proof against even the invisible impurities that cause nodules and porousness, proof against losses caused by rejects and reworking. Write for complete details or contact your regular plating supplier.

ALSOP

ENGINEERING CORPORATION

Filters · Filter Discs & Sheets · Mixers · Agitators

904 Keen Street Milldale, Connecticut

Other Alsop Plating Room Equipment

We manufacture a full line of Mixers and Agitators covering a complete range of sizes, for mixing, blending, and dissolving. Stainless Steel Mixing Tanks are also available in a wide range of capacities. For full details and illustrations write for your free catalog.

ELECTRIC BLUE M INDUSTRIAL TYPE BATCH OVENS. Three models of the Blue M Industrial Type Batch Ovens are described on a data sheet available from **Blue M Electric Co.**, 306-308 West 69th St., Chicago 21, Ill. Features and applications are listed. Page two is devoted entirely to construction features and specifications.

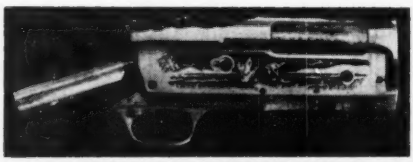
"BLAST CLEANING," a new booklet written by Victor F. Stine, vice president, **Pangborn Corporation**, Hagerstown, Md., aims at explaining abrasive cleaning in a new way.

Its purpose is to supply non-technical information to anyone who would like to know more about the possibilities of blast cleaning in his field. The story begins with a discussion of the three basic advantages of the process: faster cleaning, cheaper cleaning, and improved quality of finish. This leads to a brief analysis of where it can be used and how the abrasive is forcibly propelled.

Blast cleaning has experienced four major advancements which have helped industry increase production standards: the invention of mechanized cleaning equipment; the adoption of metal abrasive; the use of centrifugal force; and gearing the cleaning department to the production line. These have all contributed to the development of the completely automatic plant, which is so close to hand.

The economics of blast cleaning are discussed in terms of the type of surface to be cleaned, finish required in a specified time, and the price per piece cleaned with lowest possible maintenance cost.

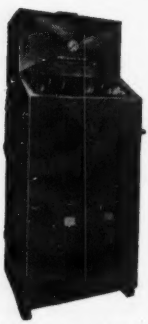
PAINTS, A GUIDE FOR THEIR SELECTION AND USE FOR INTERIOR SURFACES. Prepared for the **American Hotel Association,** 221 West 57th St., New York 19, N. Y., by the York Research Corporation of Connecticut, this report is designed to cover the important problems of paints and painting. Part I is essentially a discussion of the composition of paint and how to apply it. Part II discusses the methods used to test the various properties of the paints submitted for the project. A series of charts summarizing the test results on all acceptable paints is appended.



BEFORE PRESSURE-BLASTING

AFTER PRESSURE-BLASTING

SATIN-FINISH, INTRICATE FILIGREE WORK . . . NO STOCK REMOVAL, NO ETCHING . . . WITH PRESSURE BLAST!



MODEL A . . . ONE OF 4 STANDARD UNITS. CUSTOM MACHINES DESIGNED TO FIT SPECIAL REQUIREMENTS.

FREE . . . Learn what PRESSURE BLAST can do for you! Die and Mold Polishing, Blending Grind Lines, Deburring, Heat Treat Scale Removal, Honing of Cutting Tools, Pre-plating Cleaning . . . Hundreds of proven, money-saving applications!

Write for our new 8 page fully illustrated Booklet . . . or send samples of work you want tested to:

the CRO-PLATE Company, Incorporated

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Sewing Machines? Automotive Parts? Electrical Appliances?

NO MATTER WHAT YOUR INDUSTRY, YOU CAN BENEFIT AND PROFIT FROM YOUNG & BERTKE'S

DUST and FUME CONTROL

Young & Bertke Dust and Fume Control systems increase efficiency of dust producing machinery, cut maintenance costs and downtime. National Sewing Machine Co., The Randall Company and Avco Mfg. Co., partners in progress . . . solved their dust collecting problems by building a web of safety around "iron men" to maintain new, high speed operations and processes. Machinery, saw and sander dust was a common problem in their respective operations . . . but varied widely. Let Young & Bertke solve your problems by writing for Brochure and information chart, today.

DESIGNED - FABRICATED - INSTALLED

The YOUNG & BERTKE Co.

DUST and FUME CONTROL • OVENS • SPRAY BOOTHS

2291 BUCK ST. CINCINNATI 14, OHIO

Let Us Modernize Your Present System

DYNEL WINDSOR FELT. The physical properties, chemical properties, filtration characteristics, and typical applications of Dynel Windsor Felt are listed in a Fact Sheet available from **American Felt Company,** Glenville, Conn. Issued by the Engineering and Research Division of American Felt, the Fact Sheet states that Dynel Windsor Felt is intended to be used as a filter press or vacuum filter mat where a high degree of clarity is required. A sample of the material is included.

ERTEL POSITIVE SEAL CYLINDER TYPE DISK FILTER. A catalog sheet produced by **Ertel Engineering Corporation** of Kingston, New York, illustrates and describes the Ertel Cylinder Type Disk Filter Model ECD and the Ertel Model Down-Flow Filter.

The Model ECD is stated to have many uses in many industries and is recommended for plating solutions such as copper, nickel, chrome, tin, and so forth. The ECF Down-Flow Model is recommended specifically for operations involving costly, volatile, or dangerous solutions. The following claims are made for the filter: keeps unfiltered material to minimum, prevents bypassing of unfiltered liquids, allows use of various filter media, prevents loss due to leakage or evaporation, makes cleaning quick and easy.

Design and construction features of the filters are shown by means of illustrations, and the principle of operation is shown by means of a cross-sectional diagrammatic view of a typical filter unit.

PROTECTION WITH PARLON. Thirty-five case histories of the successful use of protective coatings based on chlorinated rubber are included in a booklet available from **Hercules Powder Company,** Wilmington 99, Delaware. Water and sewage works, paper mills, storage tanks, and chemical and food processing plants are among the installations located from coast to coast where Parlon-based coatings have been photographed after long-term exposure to a variety of corrosive environments. Also included in the twenty-page booklet are performance data on Parlon finishes and instructions for applying Parlon paints by brush or spray to metal, wood, and various cement and asphalt surfaces.

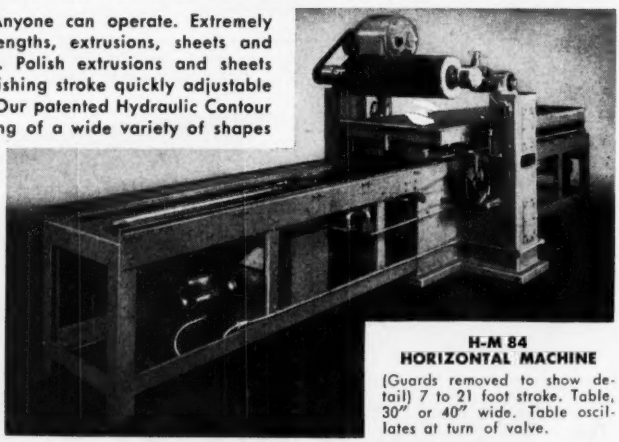
Speed Up Your Finishing Operations with CENTRAL POLISHING MACHINES

Hydraulically operated. Anyone can operate. Extremely versatile. Handle long lengths, extrusions, sheets and many odd-shaped pieces. Polish extrusions and sheets their ENTIRE LENGTH. Polishing stroke quickly adjustable 2 inches to full capacity. Our patented Hydraulic Contour Device permits the finishing of a wide variety of shapes and contours.

- Polishes extrusions and sheets complete, end to end.
- Simple operation. Women run them.
- Adjustable stroke 2" to full capacity.

Machines, 7 to 21 foot stroke.

FULL INFORMATION ON REQUEST.

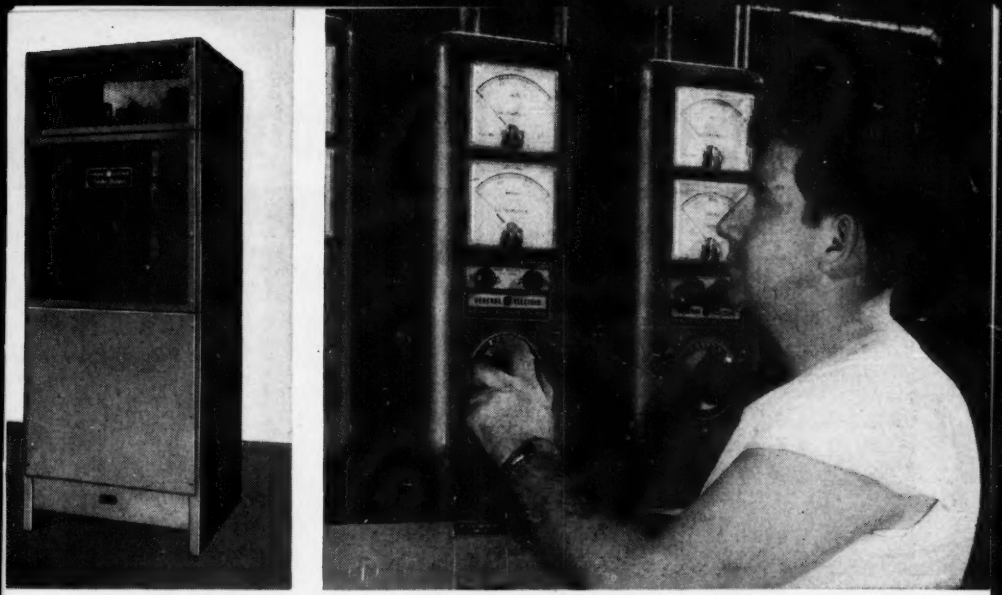


H-M 84 HORIZONTAL MACHINE

(Guards removed to show detail) 7 to 21 foot stroke. Table, 30" or 40" wide. Table oscillates at turn of valve.

CENTRAL MACHINE WORKS

72 COMMERCIAL ST. • WORCESTER, MASS.



AUTOMATIC REGULATION is in top section of plating power supply. Operator sets desired voltage level on control station near tank, and automatic regulation maintains his setting.

Automatic Regulation on G-E Plating Power Supplies Increases Productivity and Reduces Costly Rejects

Once you have set the voltage or current on an automatically regulated General Electric Plating Power Supply, no further adjustments are needed. Automatic regulation maintains your setting within ±2 per cent, regardless of variations in line voltage or tank load. Equipment is available to automatically regulate voltage or current, or both.

SAVINGS—Automatic regulation saves you money several ways. There is no need to check and adjust current or voltage. By eliminating human error, it assures work of more uniform quality. It facilitates continuous production without expensive shutdowns for maintenance or adjustments. Finally, it greatly reduces rejects caused by current or voltage variations.

FLEXIBLE—Automatic regulation will maintain any setting between 16 and 100 per cent of rated voltage, or 10 and 100 per cent of rated current. It is available as an integral part of G-E plating power supplies, or can be added later to manually controlled units.

MORE INFORMATION is available from any authorized G-E agent, or by writing Sect. 464–15E, General Electric Company, Schenectady 5, N. Y.

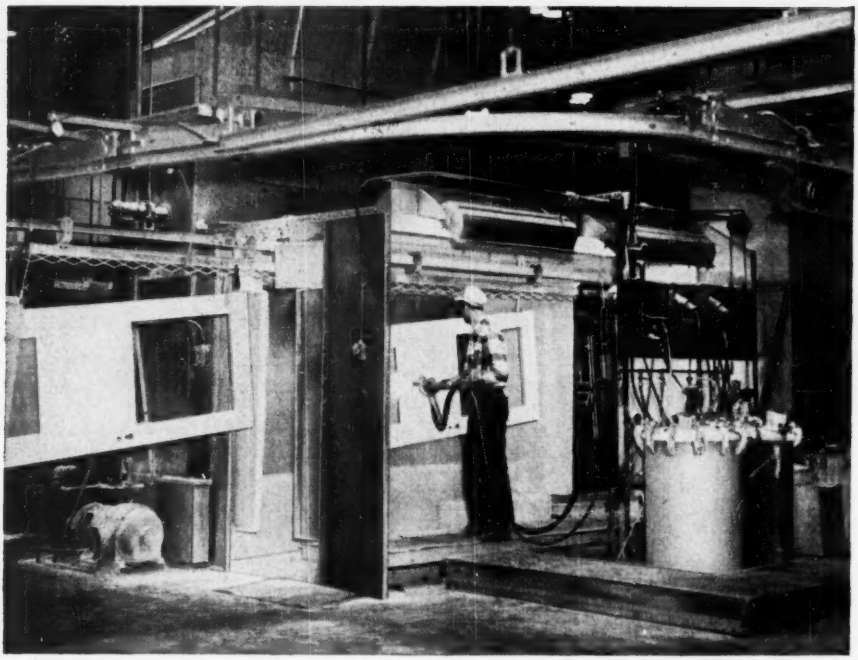
BARREL PLATERS

Economical, 12-volt barrel platers are available in ratings from 500 to 2000 amperes. Your nearest agent has full information.

You can put your confidence in—

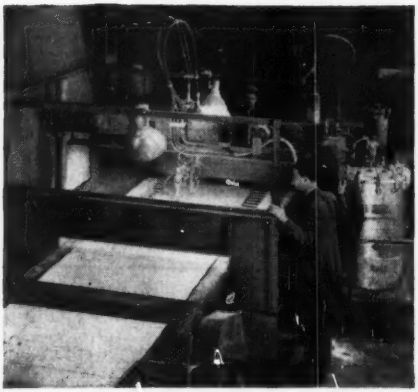
GENERAL ELECTRIC

Lifetime finish applied to movable



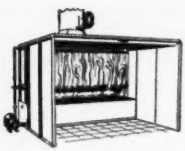
Panels, doors and fittings for Movable Interiors are given a prime coat of enamel in DeVilbiss Water-Wash Spray Booth — one of eight at The E. F. Hauserman Company.

DeVilbiss helps you get the *most* from the spray method



Automatic spraying is cutting costs for many manufacturers. DeVilbiss has a wide variety of standard automatic spraying machines to serve you.

Spray Guns



Spray Booths

walls with DeVilbiss equipment

The E. F. Hauserman Company uses eight DeVilbiss Spray Booths in its busy production line to paint movable wall panels, doors and fittings.

"We like DeVilbiss' versatility for our Movable Steel Interiors . . . it does a good job for us," says Don Clapp, general superintendent of The E. F. Hauserman Company, Cleveland, Ohio – the nation's oldest and largest manufacturer of movable partitions and wainscot.

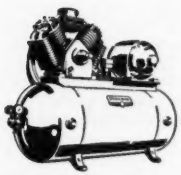
One of the attractive, money-saving features of Hauserman Movable Interiors is that they'll stay new looking almost indefinitely *without repainting!* This feature alone saves thousands of dollars in maintenance costs for offices, schools, laboratories, hospitals and industrial plants that use Hauserman Movable Interiors. Hauserman uses DeVilbiss equipment extensively – Spray Guns, Spray Booths, Pressure-feed Tanks, Hose and Connections – to apply its exclusive, lifetime surface finish to its products.

If you, too, would like to get the most from the spray method, get full data about DeVilbiss equipment from your nearest DeVilbiss jobber or branch office, today. Or write us direct for free literature.

THE DEVILBISS COMPANY
Toledo, Ohio

Santa Clara, Calif. • Barrie, Ontario
London, England

Branch Offices and Distributors in Principal Cities Throughout the U. S., Canada and the World



Air Compressors

Hose and Connections

FOR BETTER SERVICE, BUY
DEVILBISS

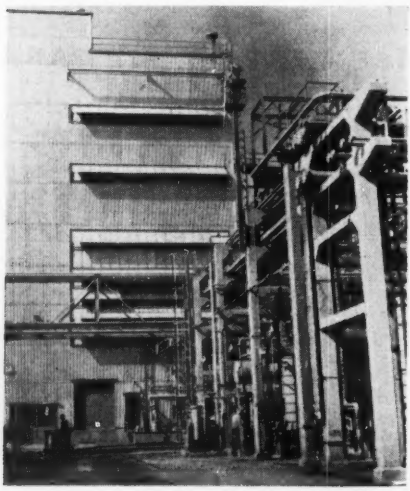
NEWS of the Industry

NEW PLANTS

The world's largest epoxy resin plant has just been brought on stream in Houston, Texas, by **SHELL CHEMICAL CORPORATION,** it has been announced by C. W. Humphreys, manufacturing vice president. The plant will triple the company's supply of Epon resins, materials in great demand in both the surface coatings and the structural fields.

As part of this same expansion Humphreys said Shell Chemical is also opening a bis-phenol-A plant, which makes this new unit independent of outside suppliers for this component of Epon resins. The manufacture of epichlorohydrin, the other chief component of these resins, was pioneered by Shell Chemical.

Since they were first made available in 1947 these resins have had an acceptance that has been spectacular even in the fast-growing resins and plastics field. Paints formulated on Epon resins are being used by virtually all washing machine manufacturers, due primarily to their unusual resistance to alkalies and detergents. For the same reasons they are being adopted in a variety of other applications — in linings for containers of corrosive chemicals; in industrial maintenance paints where corrosion resistance is a must.



Houston, Texas, epoxy resin plant of Shell Chemical Corporation.

COMPANIES

A steady increase in the sales of industrial cleaning and metal treating compounds during the coming years was forecast by John A. Carter, president of **OAKITE PRODUCTS, INC.,** in a talk before the company's division managers at their annual conference in New York's Hotel Roosevelt.

"The rapid advances made in mechanized cleaning over the past few years have cut production costs and stepped up both the quality and rate of production," Mr. Carter stated. He cited the savings made possible in the metal industries by combining cleaning and phosphating in one spray-washing operation; in the food industries by the use of hot-spray cleaning; in the dairy industry by new in-place cleaning techniques; and in the petroleum industry by circulating cleaning solutions through equipment.

CUTS COSTS like Magic!

Chicago Rubber Company's amazing new R54 contact wheel cuts better—faster—longer and will substantially reduce your grinding and polishing costs 3 ways.

This precision machined and accurately balanced wheel is easily and quickly knocked down and reassembled for tire replacement or change.

- Replace only the rubber tire when necessary instead of the entire wheel.
- Choose from a complete assortment of tire treads for different grinding operations, still using the same wheel.
- And as usual Chicago Rubber Company's R54 contact wheel allows you to get the most wear from your abrasive belt—more than you ever got before.

There is a replaceable rubber tire with proper tread for every grinding requirement and in a wide variety of durometer ratings. Write for descriptive literature.

"IT'S THE WHEEL THAT DOES THE WORK"

CHICAGO RUBBER COMPANY, INC.

Main Office & Factory
2620 N. Clybourn Ave. Chicago
Makers of the COSMOWHEEL

Reviewing the history of the company, Mr. Carter pointed out that Oakite is continuing its program of expanding its present field service staff of more than 215 men, and that the company's research and service laboratories will move to larger, more modern quarters at 350 Hudson Street, New York City, about April 1.

The **PROMAT DIVISION** of **POOR & COMPANY**, Waukegan, Illinois, has appointed **INDUSTRIAL MATERIALS CO.**, 383 Brannan St., San Francisco, Northern California distributor for Promat metal finishing processes. Included in the line will be Probrite White Alloy, Promat copper, cadmium and zinc electroplating processes and Promat chromate treatments.

Howard J. Lackey, Jr., owner of Industrial Materials Company, is a graduate of the University of California at Berkeley. The firm's activities cover Central and Northern California.

Dee F. Mosher, vice president of **LEA-MICHIGAN, INC.**, Detroit, Michigan, has announced the new company name, which formerly was Lea Mfg. Company of Michigan, Inc. Lea-Michigan, an affiliate of The Lea Mfg. Company of Waterbury, Conn., manufactures Lea Gripmaster Polishing Wheel Cements, Lea Liquabrade—liquid buffing compositions—and other related Lea surface finishing products and processes for the buffing, metal polishing and plating industry.

Dee F. Mosher

SPECIAL CHEMICALS CORPORATION has moved its office facilities to new and larger quarters at the Ossining plant. New company address is: 100 S. Water St., Ossining, N. Y.

THE RAPID ELECTRIC COMPANY, 2877 Middletown Road, Bronx, N. Y., has announced the appointment of Ardco, Inc., 5000 W. 73rd St., Chicago, Ill., as exclusive factory representative in the metropolitan Chicago area. Ardco, Inc., will handle all aspects of the distribution of Rapid Electric Precision Engineered Selenium Rectifiers, and will be available for consultation on installation and engineering of the rectifiers for electroplating and finishing plants.

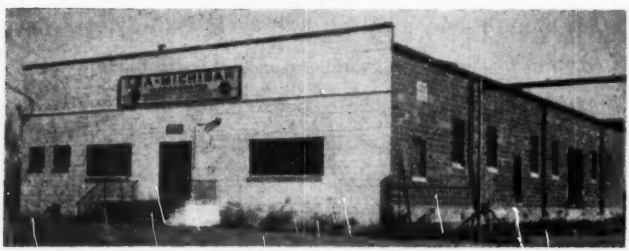
THE LACQUER & CHEMICAL CORPORATION, Brooklyn, New York, has announced the formation of the Alaka Plastic Specialties Division which will manufacture and sell plastisols, organosols and latex compounds, as well as styrene, acetate, butyrate, vinyl, acrylic, and vacuum metallizing coatings.

Several areas in the East are still open for manufacturer's representatives.

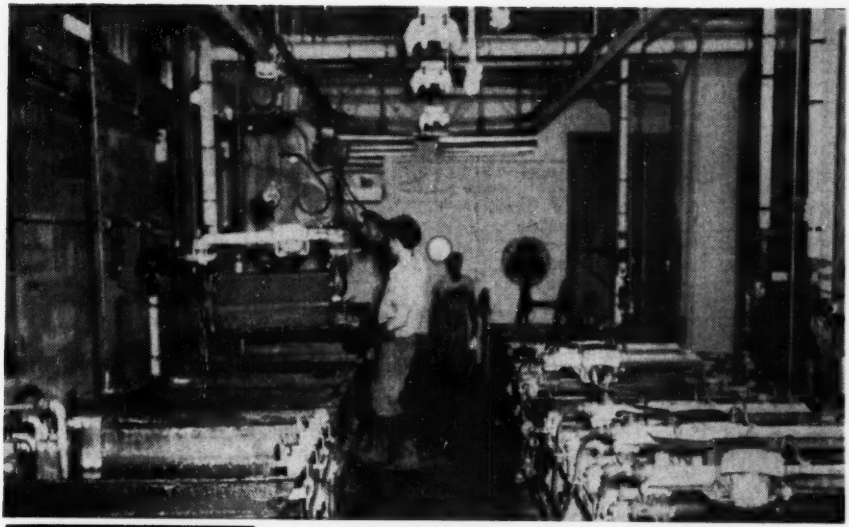
The 200th anniversary of **DEVOE & RAYNOLDS CO., INC.**, was celebrated recently at a banquet in the Roosevelt Hotel, New Orleans, La. President W. C. Dabney and Chairman of the Board E. S. Phillips told the company's salesmen, gathered in New Orleans for a regional meeting, that the opening of the third century of the company's existence, marked a new era of expansion and vitality for this nationally known paint manufacturer.

Karl Schneidau, New Orleans branch manager, was present along with other local Devoe representatives and salesmen from 12 states.

At the annual sales meeting, J. Harold Kolseth, vice president in charge of All Trade Sales Divisions, said that the paint industry expects to surpass last year's record-breaking sales volume.



Plant of Lea-Michigan, Inc.



LAZO LUCITE PLATING BARRELS

LAZO OVERHEAD MOTOR DRIVES

SAVE TIME -- LABOR

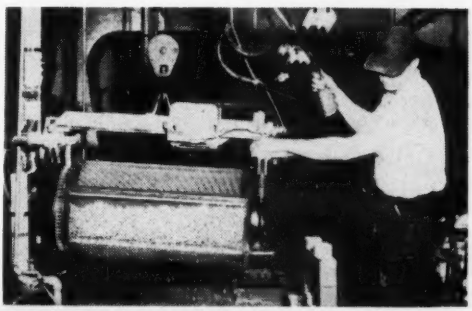
INCREASE PRODUCTION

Like many other progressive plating plants, Varland Metal Service, Inc., Cincinnati, Ohio, chose LAZO Lucite Plating Barrel, Full Cycle Unit(s) to expand its plating facilities and greatly increase production.

Several views of LAZO equipment are shown herewith.

Get the latest facts on how LAZO can efficiently and economically improve your production. No obligation.

Write for new 1954 Catalog Now.



HARDWOOD LINE Mfg. Co.

Lucite Cylinders for Complete Cycle Plating

Unexcelled Service

2022 N. CALIFORNIA AVE. • CHICAGO 47, ILLINOIS • Dickens 2-9373

Sales for Devoe & Raynolds in 1953 were the highest in the 200-year-old firm's history, he revealed, and percentage-wise were higher than the industry's overall increase.

An "Open House" to demonstrate a new hard chrome plating unit will be held by **WAGNER BROTHERS, INC.**, in Detroit, from April 12 through April 17, 1954. The invitation to attend is offered to anyone with problems associated with the wear and abrasion of parts such as cutting tools, bushings, shafts, and the reclamation of undersize parts.

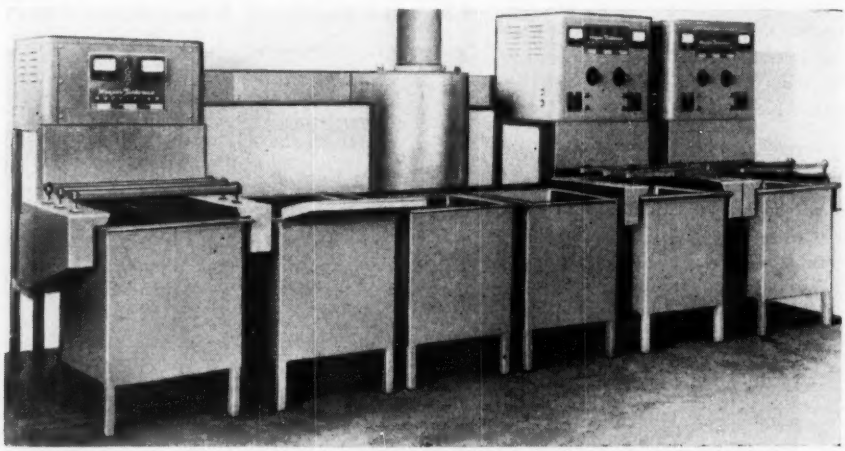
Cutting tool life has been increased up to 1000 per cent by their hard chrome surfacing method, the company states. Employing the "Morey Process," the complete set of five tanks, five rectifiers, a fume separator, automatic heating elements and controls enables manufacturers to set up their own production hard chrome department with a minimum of installation cost and provides precision deposition and control of plate thickness and greater throwing power into grooves and recesses. Included in the package is two weeks of thorough instruction enabling an inexperienced operator to get precision results formerly obtainable only by experts, according to the company.

The actual hard chrome plating process will be demonstrated daily from 4:00 P.M. at 7515 Lyndon, Detroit. Guests are welcome to submit items for plating Buffet refreshments will be served. Visitors are requested to write O. H. Tiedeman, c/o Wagner Brothers, 432 Midland, Detroit 3, Mich., on business letterhead, stating type of part to be processed.

Drums recently used by the **MAGNUS CHEMICAL CO.** of Garwood, New Jersey, have been redesigned by Jim Nash, industrial designer, New York. The large drums for the variety of chemical cleaners and lubricants manufactured and distributed under the Magnus trademark have been changed to a dramatic orange, blue and white design on which the trademark and brand name are dramatic and eye-compelling.

Against an orange background a large white triangle pointing toward the bottom of the drum forms the background for the trademark, and at the same time creates the illusion of a larger drum. The new trademark, also designed by Jim Nash, is a bright blue globe of the world and has thin longitudinal and latitudinal lines in bright orange. A hand in the position of cleaning the world appears on the lower right side of the globe, also in bright orange. The signature appears in white on the orange part of the drum.

"The Magnus drums serve as moving billboards for the company," said Russell D. Kreie, advertising manager for Magnus Chemical. "On the trucks rolling along highways, on flat cars, in railroad



Hard Chome Plating Unit

See how you get better quality at lower cost!

THESE magnified, unretouched photos show the comparison of gear teeth surfaces when burrs are removed by hand and when burr removal *and blending* is done by the Osborn *Brushamatic.** The blended surface junctures have no scratches to concentrate stresses. Their uniformity and smoothness mean superior performance and greater life expectancy.

You not only get *greater quality* when you remove burrs and blend with the *Brushamatic*... This push-button method *boosts output* per manhour as much as 5 to 10 times. Scrap loss is nil. It saves floor space and it is neat and clean.

The **O**sborn **B**rushing **A**nalyst will gladly help you find out how you can improve your products and cut costs with this new technique. Call your **OBA** today or write *The Osborn Manufacturing Company, Dept. O-16, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

INFORMATION: *Write today for your copies of Booklets on Automatic Deburring and on Brushamatic Machines.*

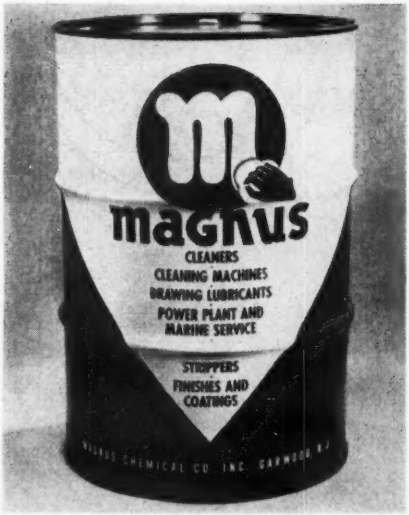
*Trade-Mark

20 times as fast. *Here, the Osborn Brushamatic removes burrs and blends counter balance bearings for aircraft engine. With former method, output was 6 parts per hour. Present Brushamatic rate is 120 parts per hour. Results are perfectly uniform... piece after piece.*

See the Brushamatic in operation at the ASTE Show, Booth 627.

Osborn Brushamatic

BETTER QUALITY... LOWER COSTS... AT THE PUSH OF A BUTTON



Magnus Chemical Drum

warehouses and on shipping wharves, wherever the drums are seen, they advertise Magnus chemicals."

The recent meeting of **CHANDEYSSON ELECTRIC COMPANY** distributors, held to inaugurate the 50th anniversary of the company's founding, included a program of information and education on the company's products and manufacturing facilities. Engineering considerations, manufacturing techniques and marketing methods were covered in the brief training courses presented to the distributors.

Distributors of Chandeysson products are: Alert Supply Co., Los Angeles 58, Calif.; The Chemical Corp., Springfield 9, Mass.; Donald Sales & Mfg. Co., Milwaukee 13, Wis.; Lamkin Brothers Co., Pittsburgh 22, Pa.; LaSalco, Inc., St. Louis 4, Mo.; J. C. Miller Co., Grand Rapids 3, Mich.; C. C. Mitchell Equipment Co., Sylvania, Ohio; Munning & Munning, Inc., Newark 5, N. J.; Munning & Munning, Inc., New York 7, N. Y.; George L. Nankervis Co., Detroit 23, Mich., George A. Stutz Mfg. Co., Chicago 12, Ill.; and W. W. Wells, Ltd., Toronto, Ont. 2, Canada.

The Board of Directors of **INDUSTRIAL OVENS, INC.**, has announced that reorganization of Industrial Ovens has been completed in accordance with plans undertaken a year ago.

Industrial Ovens, Inc., of Cleveland, Ohio, designs, manufactures and installs continuous materials handling and processing systems, generally involving the engineered application of heat.

IOI's design staff now offers registered engineering consulting service. A completely equipped structural steel fabricat-

During the recent 50th anniversary celebration of the founding of the Chandeysson Electric Co., distributors of Chandeysson products were conducted through the firm's manufacturing facilities so that engineering and design features of the products could be explained fully.

HARSHAW PERGLOW BRIGHT NICKEL

Harshaw Perglow Bright Nickel . . . proved with more than 227,000,000 ampere hours of successful operation.

Harshaw Perglow is ready for you NOW! For complete details write or call today.

THE HARSHAW CHEMICAL CO.

1945 East 97th Street, Cleveland 6, Ohio

Chicago 32, Ill. · Houston 11, Texas · Philadelphia 48, Pa. · Cincinnati 13, Ohio · Los Angeles 22, Calif. · Pittsburgh 22, Pa. · Cleveland 6, Ohio · Detroit 26, Mich. · New York 17, N. Y.

ing and machine shop has been added to IOI's manufacturing facilities. Addition of a sheet metal shop is planned for the near future.

HOWARD R. RICHARDS has been elected president and general manager. He became associated with IOI in October, 1952, as vice president and general manager. Previously he was a division plant superintendent for Armour & Company. A registered engineer in Ohio, Mr. Richards is a member of the Professional Engineers Society.

Newly elected Vice President **SLOANE E. ALLEN** has been employed by IOI since 1946. He was purchasing agent and general manager of Kindt Collins Company prior to his association with IOI.

LOUIS A. LITZLER, secretary of IOI and a practicing attorney, serves in a legal capacity.

E. W. BAUMGARDNER, sales manager, has been employed by IOI since 1946, serving as project engineer and chief engineer. He was a design engineer at National Carbon Company from 1937 to 1946.

A registered engineer in New York and Ohio, IOI's new Chief Engineer **A. V. ALEXEFF** was employed by Babcock and Wilcox Company from 1937 to 1953 as supervising engineer. He is a member of the Professional Engineers Society.

Dennis Durbin

MICHIGAN BUFF CO., INC., Detroit manufacturer of buffs and polishing wheels, recently established a sales and service center in Cleveland. Taking over a warehouse at 1109 St. Clair Ave., Cleveland, Michigan Buff Co., has completely stocked the new location with polishing wheels, new and used buffs, abrasive belts, compound, grain, glue, and various polishing, buffing, and finishing supplies, in order to give fast service in the greater Cleveland and Ohio district.

DENNIS DURBIN, a veteran of ten years' experience in the polishing and buffing supply business, has been named manager of the Cleveland location.

NEW POSITIONS

Northwest Chemical Company, Detroit, Mich., has announced the appointment of **MARION F. WILSON**, as sales representative in Kentucky, Tennessee, and parts of Indiana.

Mr. Wilson is a graduate of the University of Louisville, and a member of the American Society of Tool Engineers. He has worked with the metal finishing industry for the last several years, and this experience has been augmented by special training given by Northwest Chemical Company.

I. H. Gallaher, president of Clover Mfg. Co., Norwalk, Conn., manufacturer of abrasive coated papers, cloths and fibre, and Clover Lapping and Grinding Compounds, has announced the appointment of **WALTER R. TREZISE** as sales manager.

Mr. Trezise, formerly connected with Behr-Manning Corp., and Armour & Co., has a varied background in the field of coated abrasives. His previous sales connections have given him extensive experience in the use of abrasives and the operation of various types of equipment for which they are best suited.

Donald L. Price

DONALD L. PRICE has been named sales manager of the Abrasive Division by Norton Company, Worcester, Mass.

Mr. Price, who has been sales manager of the Eastern Region since 1952, started with Norton in 1920 as a mail boy. He later became stock man, and sales engineer. He later served as field engineer and was Detroit District manager until 1949 when he was recalled to Worcester.

He is an alumnus of Clark University and the Harvard Advanced Management Program. He is presently a member of the Defense Committee of the Grinding Wheel Institute, and the American Society of Tool Engineers.

NEW WYANDOTTE "FLOTE" for water-wash spray booths

Only 75¢ worth of "FLOTE" a day Saves up to $3,500 a year in maintenance costs!

New and different! spray booth product, "FLOTE," eliminates sinking paint sludge, stops clogging and paint buildup!

Whatever organic finishes you use, no matter what type water-wash spray booth you employ — new "FLOTE" will increase operating efficiency and cut maintenance costs!

Think of it! New "FLOTE" added to your water system floats all types of sludge — even heavy primers — and *keeps them afloat* for easy skimming.

"FLOTE" away your paint booth problems. For information on this new and different Wyandotte product — **mail coupon today!**

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Helpful service representatives in 138 cities in the United States and Canada

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(Left to right) Vincent Pisani, R. C. Clement, R. T. Browning, W. A. Hockett

Following his election to the presidency of Wallace & Tiernan Incorporated, F. G. Merckel has announced the appointment of the following sales personnel: vice president in charge of sales, **ROBERT T. BROWNING**; director of sales—W&T Division, **WILLIAM A. HOCKETT**; manager of field sales and service, **RUSSELL C. CLEMENT**; manager of departmental sales, **VINCENT PISANI.** Wallace & Tiernan Incorporated is the corporation formed by the merger of Wallace & Tiernan Co., Inc., and Novadel-Agene Corporation.

Mr. Browning has had wide experience in both the chemical and equipment lines. He started some twenty-odd years ago as a field salesman and subsequently held positions in the advertising department, the Kooler-Keg Division, manager of Electro Rust-Proofing and most recently as director of sales and secretary of W. C. Hardesty Co., Inc., a Wallace & Tiernan subsidiary. He is a member of a number of technical and trade associations.

Mr. Hockett began his career with Wallace & Tiernan in the Chicago office over twenty-five years ago and later went to the Indianapolis office. Later, he became manager of the Export Division with responsibility for all the company's foreign operations. He has been an active leader in international trade and technical associations.

Mr. Clement has been associated with the Wallace & Tiernan field organization for over twenty-five years. For a good part of that time he was district manager in the Washington, D. C., office. After that he was made division manager at Newark with responsibility for all the northeastern part of the country. His experience particularly fits him to his new duties and his activities with such associations as the American Water Works Association keep him in close touch with technical trends.

Mr. Pisani, with over thirty-five years experience in the Wallace & Tiernan organization, has the background of main office sales operations which will be invaluable to the new management. He has grown up with the company and consequently has acquired both the feel and technical knowledge so necessary to the selling of engineering equipment.

CHARLES W. ENGELHARD, chairman and general manager of the companies composing the Engelhard Industries Group, has announced that he has relinquished his duties as president and that **GORDON V. RICHDALE** has been elected to that position.

Engaged primarily in refining and working precious metals, the Engelhard Industries constitute one of the world's largest houses in this field. It operates manufacturing and sales companies in Europe, South Africa, Australia, Japan and Latin America as well as in the United States and Canada.

Mr. Richdale comes to his new position after fourteen years in the gold mining industry of South Africa where he was a director of the Rand Mines Group. He organized the Harmony Gold Mining Co., Ltd., in 1949, becoming its first chairman and managing director; and he held the same positions with City Deep Ltd., East Rand Proprietary Mines Ltd., Central Mining Free State Areas Ltd., Exchange Yard Proprietary Ltd., Transvaal Gold Mining Estates Limited, and South African Forest Investments Ltd. Collateral interests included directorships in companies producing cement, coal, wire rope and boxes.

The companies of which he becomes president include American Platinum Works, Amersil Company, Inc., Baker & Co., Inc., Charles Engelhard Inc., East Newark Realty Corporation, Hanovia Chemical & Manufacturing Co., Irvington Smelting & Refining Works, and Nieder Fused Quartz Co.—all of which are located in the Newark area; also the D. E. Makepeace Co., Division of Union Plate & Wire Co., of Attleboro, Mass., and the National Electric Instrument Co., Inc., of Elmhurst, L. I.

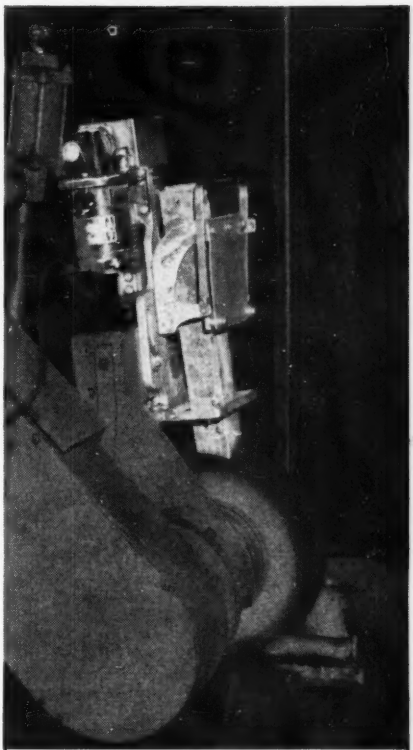
"We tried all makes ---found Nankervis best!"

That's Mr. Jim Taylor speaking. He's supervisor of finishing operations, Black & Decker Manufacturing Company, Towson, Maryland.

He's referring to a tough problem in automatic buffing recently encountered in his plant. The bugaboo was the many contours and "hard-to-get-around" projections on an aluminum casting for a B & D electric saw. A standard buffing machine had to be altered . . . and Nankervis applicators were given the job of feeding bar compound to specially-constructed buffs.

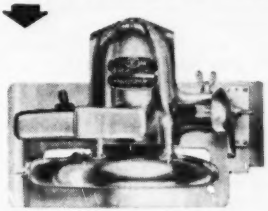
Mr. Taylor says, "We are now using 30 Nankervis applicators on this job. We tried all the different makes available and found Nankervis tops. They apply just the right amount of compound to the buff—they're easy to adjust—and are trouble free."

Results: lower man hours (no wheel tender required), economical use of compound (not too little—not too much); and smoother production flow (fewer rejects). You can save, too; send for Bulletin F-600 *today!*



(1) *Here's a Nankervis applicator at work*

(2) *Here's the complex casting*



GEORGE L. NANKERVIS COMPANY

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B. C. Mulheran

Consistent with the ARco general expansion program in production and sales facilities, Automotive Rubber Company, Inc., of Detroit, Michigan, and Houston, Texas, has announced the opening of a Cleveland sales office, to be headed by **B. C. MULHERAN.** After eleven years of sales engineering experience in the corrosive-resistant materials field, Mr. Mulheran joined the ARco organization recently to assume the post of Ohio mananger.

The Automotive Rubber Company organization designs, engineers, fabricates, and completely installs corrosion-resistant equipment. General offices are located at 12550 Beech Road, Detroit 28, Mich.

Edward R. Bartos

EDWARD R. BARTOS recently joined the sales and service staff of the Detroit office of Wyandotte Chemicals Corp.

Mr. Bartos, a native of Detroit, has majored in chemistry at the University of Detroit. He has held technical and sales positions with the Engineering Division of Chrysler Corp., American Agricultural Chemical Co. and the General Controls Co.

A member of the Detroit branch of the Paint, Varnish and Lacquer Association, Mr. Bartos has a wide acquaintance in the metal processing industry in Michigan, Ohio and Indiana.

CHARLES R. SORBER, JR., has been appointed Cincinnati District supervisor for the Metal Processing Department of the Pennsylvania Salt Mfg. Co., it has been announced by J. J. Duffy, Jr., manager of this department.

Mr. Sorber, who served as sales representative in several territories, will make his headquarters in Cincinnati. He will supervise sales in the Indianapolis-Louisville, Columbus, and St. Louis territories covered by **A. S. ENGLE, J. O. CRAM, JR.**, and **F. E. WILCHER.**

This experienced team will sell and service Pennsalt cleaners, phosphate coatings and lubricants.

E. L. Barnett

The appointment of **E. L. BARNETT** as works manager for the Binks Mfg. Co., Chicago, maker of spray finishing equipment, has been announced by Burke B. Roche, president.

Mr. Barnett will supervise Binks' manufacturing division. Before coming to Binks, he was senior engineer for A. T. Kearney & Company, management consultants. Previously he was plant engineer for the Armstrong Cork Co., Kankakee, Illinois and had served as industrial engineer and plant superintendent for other midwestern manufacturers.

A graduate of Northwestern University Technological Institute in mechanical engineering, Mr. Barnett is a member of the Industrial Management Society and the Society of the Advancement of Management. In addition to his professional and management interests, he has been active in civic enterprises.

MEETINGS

The **18th ANNUAL BANQUET AND TECHNICAL SESSION** of the **BOSTON BRANCH, A.E.S.**, to be held at the Hotel Statler, Boston, Mass., May 1, will feature the following speakers and subjects:

"Management Problems of the Metal Finishing Shop," Bruce E. Warner, president and treasurer, New England Plating Co., Worcester, Mass.

"Job Shop Pricing," Raymond J. O'Connor, president and treasurer, and Walter Rotzal, secretary, Contract Plating Co., Stratford, Conn.

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FOR STEEL PARTS WITH

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A deep, black oxide finish for rust resistance and attractive appearance. Rapid black coating in water solution without electric current. Permanent black finish on ordnance parts, tools, aircraft parts and bearing races. Decorative black finish for television and camera parts, business machines, hardware, metal screens and machine parts. Excellent bond for lacquers and enamels. Simple one bath operation. Write for bulletin H-16.

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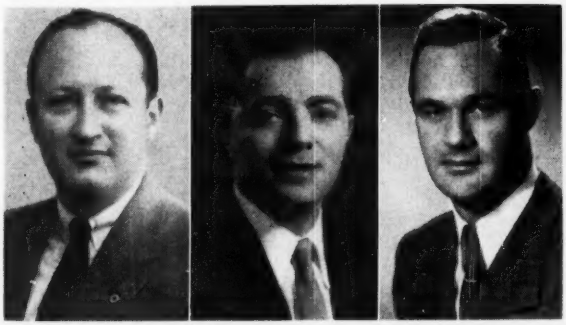
LICENSED MANUFACTURER: Electric Resistance Furnace Co., Ltd., Weybridge, Surrey, England

A. E. S. 41st ANNUAL CONVENTION, Statler Hotel, New York City, July 12 to 15, 1954.



Milton Nadel (left), Irving Goldwasser, Derick Hartshorn, Jr.

"Plating Barrels — Construction and Use," Roy A. Hoegh, Jr., chief engineer, Mercil Plating Equipment Co., Chicago.

The Educational Session will begin at 2:00 P.M. The Banquet is scheduled for 7:00 P.M. Tickets, at $7.50 per person, are available from Dr. George P. Swift, 53 Galen St., Watertown 72, Mass.

Silvio C. Taormina

The **36TH ANNUAL BANQUET AND ENTERTAINMENT OF THE MASTERS' ELECTRO-PLATING ASSOCIATION, INC.**, 59 E. Fourth St., New York 3, N. Y., will be held on May 8, 1954, in the Starlight Roof at the Waldorf - Astoria, New York City.

The Masters' Electro - Plating Association, Inc., is the largest collective group of job finishing shop owners in the New York area. Officers of the group are: Philip Ranno, chairman of the executive committee; Alfred D'Agostino, vice chairman; Frank Kaiser, treasurer; and Silvio C. Taormina, executive secretary.

Tickets for the Annual Banquet (at $25.00 per person) may be obtained at Association Headquarters.

The **INDIANAPOLIS BRANCH, A.E.S.**, will hold its **ANNUAL DINNER DANCE** at the Indianapolis Athletic Club, Saturday, May 15. Tickets, $6.00 to local members and $7.50 to all others, are available from Miss Edna Rohrabaugh, 816 Robert St., Lafayette, Indiana.

The committee for the **1954 A.E.S. CONVENTION** to be held at the Statler Hotel in New York City, July 12-15, has made arrangements to coordinate travel for members and others planning to attend the convention. **IRVING GOLDWASSER** has secured the assistance of the Atlantic-Pacific Travel Agency, Inc., 138 East 53rd St., New York, N. Y. Jules Cortell, president of the agency, suggested that anyone wishing to take advantage of this offer, which is free of any service charge, should contact him at the above address. Where enough registrations from one city or territory would make it feasible, a special plane or railroad car can be obtained for conventioneers only. The agency will also have facilities at the convention for making return trip accommodations.

The entire committee is rolling along in high gear, especially the educational section headed by **MILTON NADEL.** Mr. Nadel has delivered many papers before various branches of the A.E.S. and is librarian of the New York Branch. This background gives him an excellent idea of the subjects, quality and value of papers to be offered at educational sessions, which are the most important events of any convention sponsored by a technical society. Papers on levelling in copper

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METALWASH Tripoli Remover
cuts costs, speeds production, improves plating quality

The **METALWASH** Tripoli Remover is specifically designed for the removal of polishing compounds from metal parts prior to plating and lacquering.

Loaded racks are conveyed through the tunnel where the *complete removal* of buffing compounds is accomplished *automatically.*

Single-Stage units use an alkali cleaner or a neutral emulsion. Double-Stage machines clean with emulsion followed by an alkali cleaner.

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METALWASH SPOTLESS DRYER *eliminates hand-wiping of lacquered or plated parts.*

METALWASH PHOSPHATIZING MACHINES *provide ideal surface for lasting paint finishes.*

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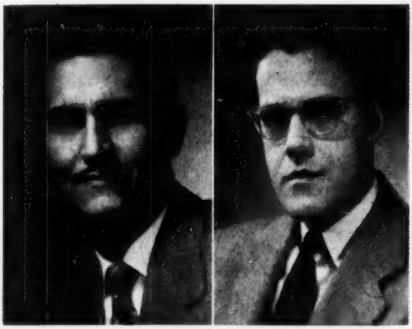
baths, electropolishing, organic finishing, polishing techniques, electroless plating, waste disposal, water treatment and other topics of interest to the finisher will be presented.

The committee has arranged to publish a Convention Journal which is being prepared by Co-Chairmen **DERICK HARTSHORN, JR.**, and **PETER L. VEIT.** This journal will be distributed at the convention and will contain the Official Program, a very interesting technical article, a list of New York Branch members, and advertisements of manufacturers and suppliers of equipment and supplies for the finishing industry. Proceeds from the Journal will be used to help defray the cost of one of the functions planned for the convention. The Co-Chairmen wish to announce that there is still time for those wishing to insert an advertisement, but urge them to do so at an early date, as the closing date is fast approaching.

SOCIETIES

The Chicago Electro-Platers Institute has elected **CHARLES N. JENSEN,** president, Jensen Plating Works, as



Robert L. Giesel (left), Charles N. Jensen

chairman to succeed Lawrence J. Hay, Plating Service Company. Also elected were **ROBERT L. GIESEL,** president, Adolph Plating, Inc., who succeeds Jensen as vice-chairman, and **JOHN LIETZ,** B. Mercil & Sons Plating Company, succeeding Giesel as secretary-treasurer.

Elected to the board of directors for two year terms were retiring chairman **HAY; C. J. KENNEDY,** American Buffing & Processing Company, **HAROLD W. BAKER,** Electro Galvanizing Company; and **FRED WAHLEN,** Mechanical Plating Company.

The Chicago Electro-Platers Institute is an association of 101 job-shop plating plants in the Chicago area.

The **NINTH ANNUAL EDUCATIONAL SESSION AND DINNER DANCE** of the **DAYTON BRANCH, A.E.S.,** was held February 27 at the Hotel Biltmore, Dayton, Ohio. Over 60 members and guests assembled for the Educational Session.

Wm. J. Neill, a past president of the A.E.S., acted as session chairman and introduced the speakers. J. C. Harris, assistant director of research, Central Research Department, Monsanto Chemical Corp., discussed, "Tests for the Determination of Metal Cleanliness."

Alan R. Burman, vice president of Cro-Plate Co., Hartford, Conn., spoke on "Wet Pressure Blasting." Mr. Burman described the ways in which a very fine abrasive, suspended in water, could be used to clean metal surfaces. Techniques used to keep the abrasive in suspension, as well as effects on the metal surface and applications of the useful process were also covered in the paper.

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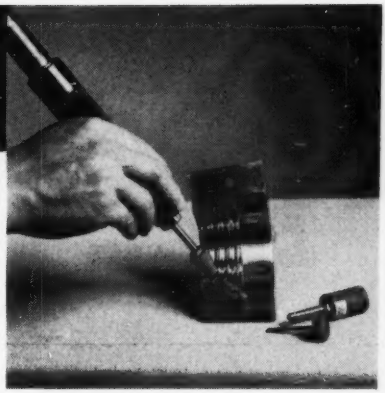

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Backed by 30 years of industrial-technical application and extraordinary performance, CRATEX high manufacturing standards insure precision-trued dimensions; uniform textures without hard or soft spots; faster cutting speeds; finishing ability without glaze or smears; smooth effective polishing . . . superior wearing qualities . . . an efficient service-life with dependable, high performance-application. Made in over 160 standard sizes in

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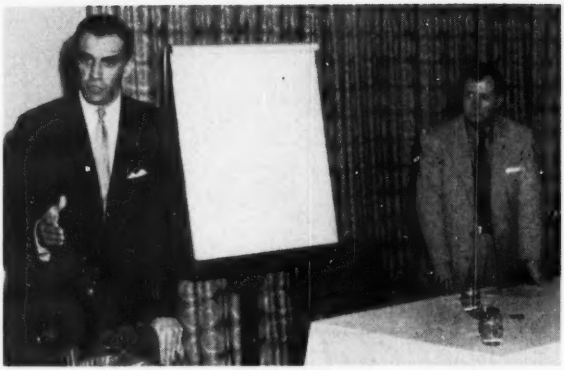

Fig. 1—Alan R. Burman (left), answers a question during the discussion period following his talk. Wm. J. Neill, session chairman, is at right.

In his talk, "Tuning Up for Protection," R. O. Hull, president of R. O. Hull Co., Inc., Rocky River, Ohio, described a method and apparatus used for testing electroplating rectifiers. Mr. Hull mentioned that cadmium and chromium solutions are particularly sensitive to variations in rectifier output. He described how the investigation of the rectifier or power source was undertaken, after laboratory results of plating tests could not be duplicated in the plant, and vice versa. Urging platers to specify full-wave rectifiers with very low ripple, Mr. Hull further stressed the value of testing rectifiers now installed so that any plating trouble stemming from that source could be eliminated.

A panel discussion of "Recent Developments in Paint Coatings and Their Usage in Industry" was sponsored by the **KANAWHA COATINGS SOCIETY,** February 25, in the West Virginia State Capitol Building, Charleston, West Virginia. Kenneth Tator acted as moderator for the session which presented N. T. Shideler, Pittsburgh Coke and Chemical Co.; Joseph Bigos, Structural Steel Painting Council; L. R. Whiting, Bakelite Co.; and G. G. Sward, National Paint, Varnish and Lacquer Association, as

Fig. 2—The speakers and some of the Dayton Branch officers. Shown (left to right) are: R. O. Hull; Alan R. Burman; Wm. J. Neill; Richard M. Clinehens, Dayton Branch president; J. C. Harris; and Holle Luechauer, Dayton Branch librarian. Not included in the picture is Rayman A. Coy, who was general chairman of the meeting.
(PRODUCTS FINISHING Staff Photos)

panel members.

Following a social hour and dinner, the panel members briefly described general trends and recent developments in the fields of surface preparation, oleoresinous coatings, bituminous coatings, and vinyl and other synthetic coatings. The 125 guests presented a variety of problems relating to the coating field in the discussion which followed. Among the topics discussed were wash primers and their proper usage, the coating of non-ferrous metals, acid pretreatment of metal surfaces to be coated, galvanized surfaces as a paint base, methods of obtaining proper surface preparation, and heat resistant coatings.

meetings OF INTEREST TO FINISHERS

April 20-21. American Zinc Institute, Thirty-sixth Annual Meeting, Hotel Statler, St. Louis, Missouri.

April 20-21. The Galvanizers Committee, sponsored by the American Zinc Institute, **Thirty-first Meeting,** Hotel Statler, St. Louis, Missouri.

Apr. 21-24. Fourth International Conference on Electrodeposition and Metal Finishing, sponsored by **The International Council for Electrodeposition.** Hotel Russell, London, England.

Apr. 24. Milwaukee Branch, A.E.S., Annual Educational Meeting and Banquet, Schroeder Hotel, Milwaukee, Wisconsin.

Apr. 27. Association of Consulting Chemists and Chemical Engineers, Inc., Symposium and Banquet, Hotel Belmont Plaza, New York, N. Y. For further information contact A. B. Bowers, Director of Publicity of the Association, 50 East 41st St., New York 17, N. Y.

May 1. Boston Branch, A.E.S., 18th Annual Banquet and Technical Session, Hotel Statler, Boston, Mass.

May 2-6. Electrochemical Society, 105th Meeting, LaSalle Hotel, Chicago, Ill. Technical sessions will include papers on electric insulation, electronics, electrothermics, industrial electrolytics, and theoretical electrochemistry.

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A general, all purpose, clear AIR-DRY coating.

Excellent in centrifugal coating machines and in other mechanical or manual dipping tanks.

Produces cloisonné effect on enamel when buffed.

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May 15. Indianapolis Branch, A.E.S., 11th Annual Dinner Dance, Indianapolis Athletic Club, Indianapolis, Indiana.

May 15. A.E.S. New England Regional Educational Session and Banquet, Hotel Bond, Hartford, Connecticut.

May 17-20. Basic Materials Conference and Basic Materials Exposition, International Amphitheatre, Chicago, Illinois. Advance registration cards may be obtained from Clapp & Poliak, Inc., 341 Madison Ave., New York 17, New York.

June 7. Institute of Cooking and Heating Appliance Manufacturers, 22nd Annual Convention and Exhibit, Netherland Plaza Hotel, Cincinnati, Ohio.

June 9-11. Eighth Annual Convention, American Society for Quality Control, Jefferson Hotel, St. Louis, Missouri. The 72 Technical Sessions will be held at Kiel Auditorium. For further information contact: U. C. Gramsch, Registrar, 8th Annual A.S.Q.A. Convention, P. O. Box 4436, Wade Sta., St. Louis 15, Mo.

June 14-18. 1954 Annual Meeting, American Society for Testing Materials, Sherman and Morrison Hotels, Chicago.

Jul. 12-15. 41st Annual Convention American Electroplaters' Society, Hotel Statler, New York City.

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Also a complete used automatic spraying outfit with pressure tank and all.
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Eastern jobber will buy used buffs of all types in any quantity. Particularly desires ventilated buffs 12" dia. x 1¼" arbor hole or larger. Also loose and sewed buffs 10" diameter and larger. Please advise quantity available and f.o.b. point. Box No. 41, c/o Products Finishing, 431 Main Street, Cincinnati 2, Ohio.

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Polishing and buffing machinery all types. Floor lathes, semi-automatic, automatic, etc. Eastern dealer will purchase used buffing equipment of any type. State Model, Ser. Number, age of machine, horsepower, current specifications, general condition, f.o.b. point and price wanted. Box No. 42, c/o Products Finishing, 431 Main Street, Cincinnati 2, Ohio.

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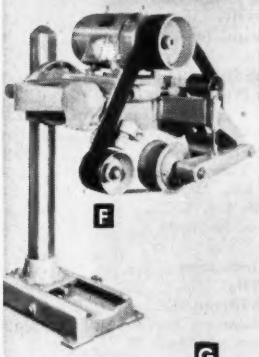
Whatever your job . . . whatever your problem . . . Murray-Way automatic equipment will do that job better and more economically • These are just a few illustrations of Murray-Way's success in beating production cost with the finest automatic equipment available • You can depend on Murray-Way engineering, Murray-Way experience, Murray-Way equipment to solve your production problems.



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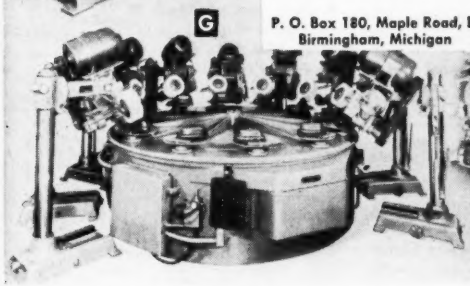

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